InSwitch Industrial Ethernet Switch

ISM Series User's Manual

V4.3

InHand Networks

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1 ISM Introduction

1.1 OverView

Welcome to use InHand Industrial Ethernet Switch (For Short InSwitch) series product. ISM series switches provide a robust, easy to use and secure switching infrastructure for harsh environments. InSwitch series of industrial design, in line with industry norms; its tools to simplify the industrial network deployment, management and replacement; and based on open standards to provide a good network security. ISM series are idea productsl for industrial Ethernet applications, including wind power, distribution automation, substation, factory automation, intelligent transportation systems (ITS) and other deployments in harsh environments..

1.2 Product Features

- **Fast redundant ring network technology to protect critical network:**

  InSwitches build fast redundant fiber ring network, based on ITU-T G.8032 protocol, high compatibility, interoperable with other proprietary ring protocol device. Support the single ring, the intersection ring, tangent ring and other complex topologies. Fast self-healing function, the ring recovery time<5ms

- **Quality of Service(QoS), intelligent control multi-service traffic**

  For some network applications, such as real-time control and VoIP, Ethernet frames need to predict the arrival time. Switch due to its frame-based buffer queue and a first-processing mechanism, the network load will produce a larger delay. QoS allows the time-sensitive data raised to the front of the queue to reduce latency and jitter, thus ensuring the normal operation of these applications.

- **VLAN(IEEE 802.1q) Simplifies network planning**

  Virtual LAN(VLAN) can separated a physical network to a logical network which has multiple independent broadcast domains. As the host can only access other hosts in the same VLAN and isolate the broadcast storm, thus VLAN provides a

measure of security. InSwitch support port-based VLAN, IEEE 802.1q and GVRP protocol to exchange information in order to ensure consistency of network VLAN.

- **Simple Network Management Protocol(SNMP), allowed integrated management**

SNMP provides a standard way for network management, it can query different vendors' equipment. InSwitch supports SNMP version V1, V2C and V3. SNMP V3 has security features such as authentication, privacy and access control. InSwitch also support many of the MIB, to facilitate the network management system with any (NMS) integration.

- **RMON(Remote Network Monitoring)**

RMON is an Internet Engineering Task Force(IETF) standard monitoring specification that allows different networks to exchange media and control system status information. RMON gives you a comprehensive network fault diagnosis, planning, performance analysis, and prophecy.

- **IGMP Snooping and GMRP**

InSwitch uses IGMP snooping (Internet multicast management protocol v1, v2 and v3) to intelligently forward or filter multicast network in the host data stream (eg MPEG video). This data can be transmitted directly to the needs of terminal equipment, and reduce the Ethernet traffic.

- **Broadcast storm suppression network to prevent storm disaster**

Broadcast storm caused severe damage and lead to failure of the network all connected devices. In the business-critical applications, it may bring catastrophic losses. InSwitch filtering based on user-defined limits to suppress broadcast packets broadcast storms.

2 Access InSwitch

In this Chapter, we will introduce the way of accessing InSwitch. There are four ways of setting configuration interface when you want to access InSwitch: web explorer, serial port, telnet and SSH. If you don't know InSwitch's IP address, you could choose

serial port configuration by using serial port line to connect InSwitch and PC's COM port. In addition, telnet and web explorer are based on LAN or Internet.

This chapter mainly includes the flowing parts:

- Web Explore Configuration
- Serial Port Configuration
- Telnet Configuration
- SSH Configuration

Attention

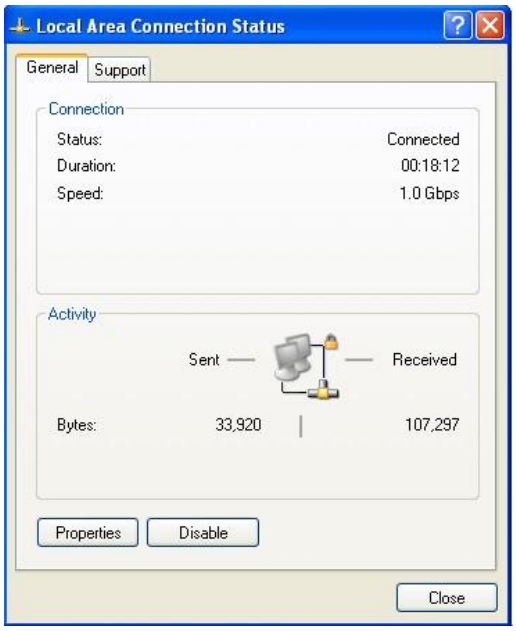
InSwitch support Web, serial, telnet and SSH, but we suggest you not to use multiple kinds of connection ways, thus you can effectively configure Inswitch .

2.1 Web Explorer Configuration

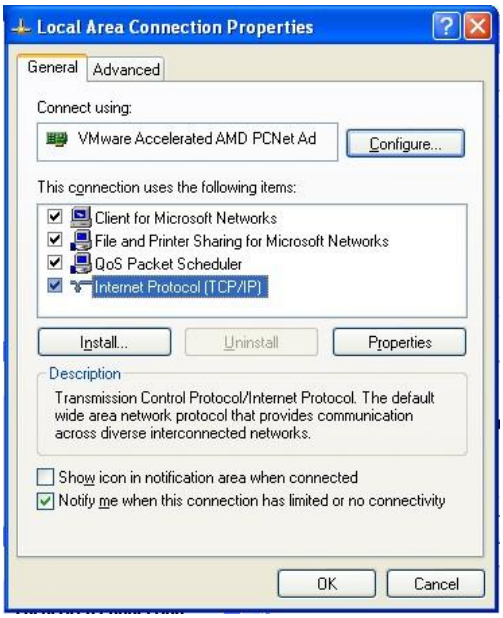
The default IP address of InSwitch is http://192.168.2.2. Please set your PC's IP address and ensure that PC's IP and InSwitch's IP are in the same network segment. The settings are as below (Based on the Windows operation system):

1) Open "Control Panel", double click "Network Connections" icon, and enter "Network Connections" Screen.

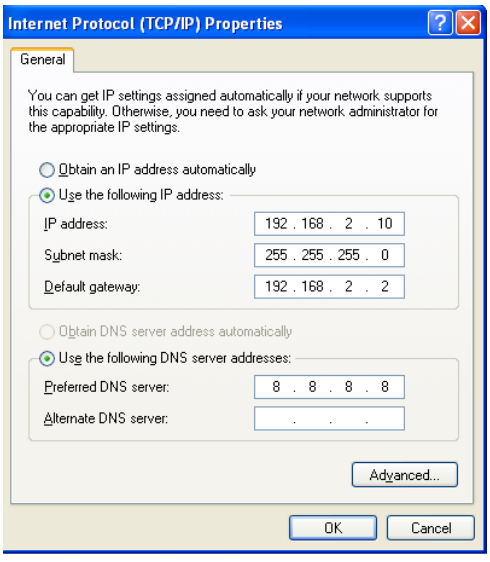
2) Double click "Local Area Connection", enter "Local Area Connection Status" screen:



3) Click "Properties", enter "Local Area Connection Properties" screen:



Choose “Internet Protocol (TCP/IP)”, click “properties” button, set your PC in the subnet: 192.168.2.0/24, for example, set IP: 192.168.2.10, Net Mask: 255.255.255.0, Default Gateway: 192.168.2.2

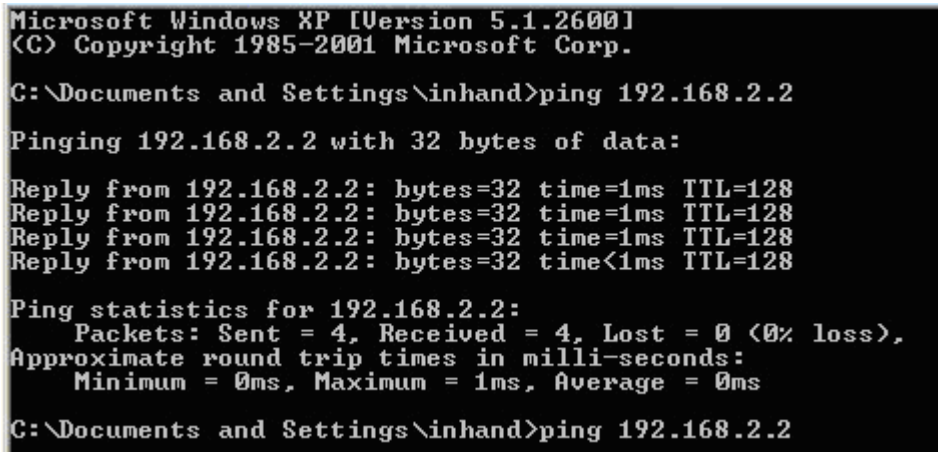

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 2 . 10
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 2 . 2
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server: 8 . 8 . 8 . 8
Alternate DNS server:
Advanced...
OK
Cancel

Click “OK”.

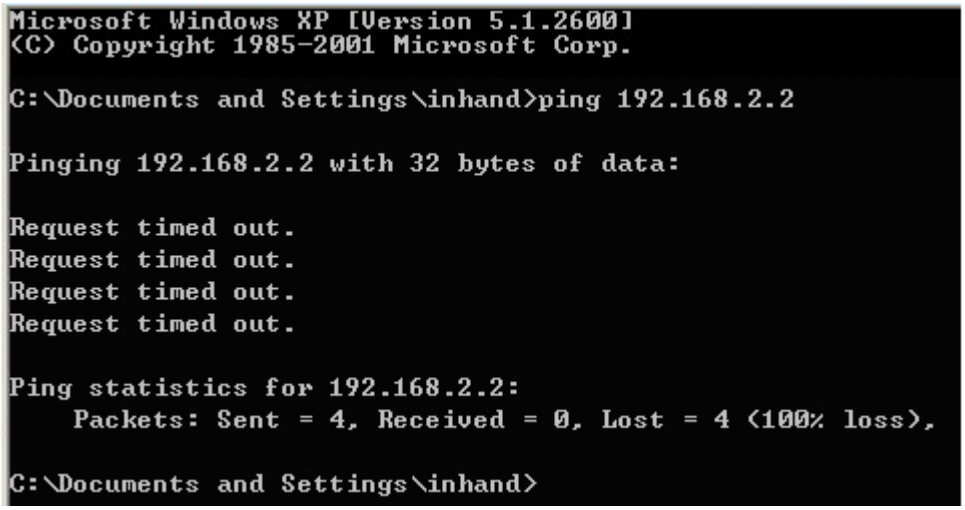
After configure TCP/IP protocols, you can use ping command to check whether the link between PC and Router is built correctly. There is an example to execute Ping command under Windows XP as below:

Ping 192.168.2.1

If the screen shows:


Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\inhand>ping 192.168.2.2
Pinging 192.168.2.2 with 32 bytes of data:
Reply from 192.168.2.2: bytes=32 time=1ms TTL=128
Reply from 192.168.2.2: bytes=32 time=1ms TTL=128
Reply from 192.168.2.2: bytes=32 time=1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.2.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\Documents and Settings\inhand>ping 192.168.2.2

Then the link between the PC and Router is correct connected. Else if it shows:


Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\inhand>ping 192.168.2.2
Pinging 192.168.2.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.2.2:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Documents and Settings\inhand>

Then the connection seems not build, and you need to check thoroughly following the former instructions.

After finishing the configuration above, you could set your InSwitch:

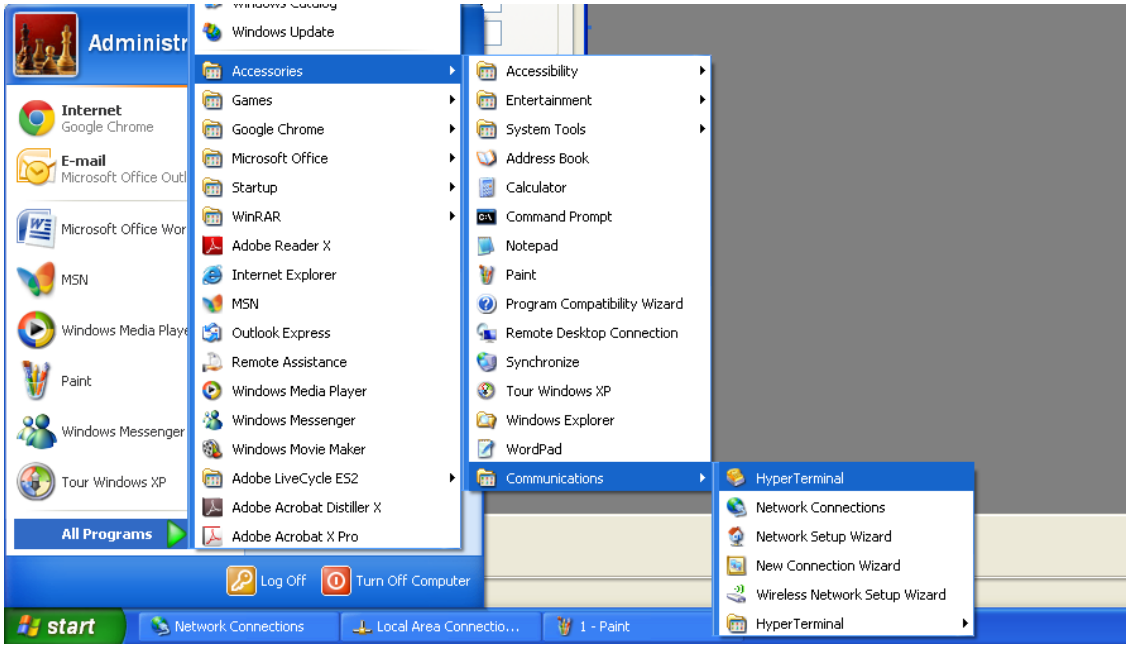
Open IE browser, input the default IP address of the Switch: http://192.168.2.2, you can see the login web below:

Input “username”(default: adm) and the “password” (default: 123456), and then click “login” to enter the operation screen.

2.2 Serial Port Configuration

Before using Serial Port to login InSwitch, please connect InSwitch’s RS-232 console port to PC’s COM port through serial port line. Please refer to the following steps and set Windows XP hyper terminal to login serial port console.

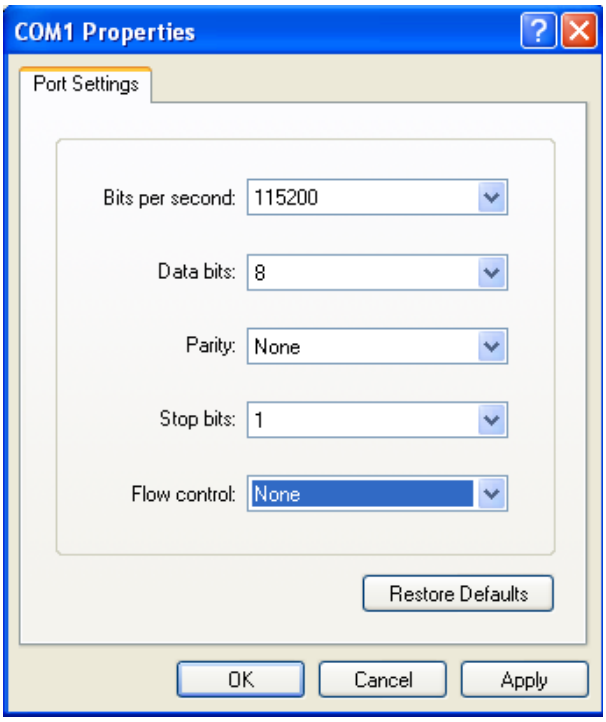
1) Windows desktop, click “Start up” -> “All Applications” -> “Attachment” -> “Communication” -> “Hyper Terminal”.



2) Input the connection describing, for example “InSwitch”, then click “OK”.

3) Choose COM port which is used in connecting Switch, then click “OK”. (The COM port number is up to your computer’s system setting.)

4) Set connection value, then click “OK”.



Bits per second: 115200 baud rate as default

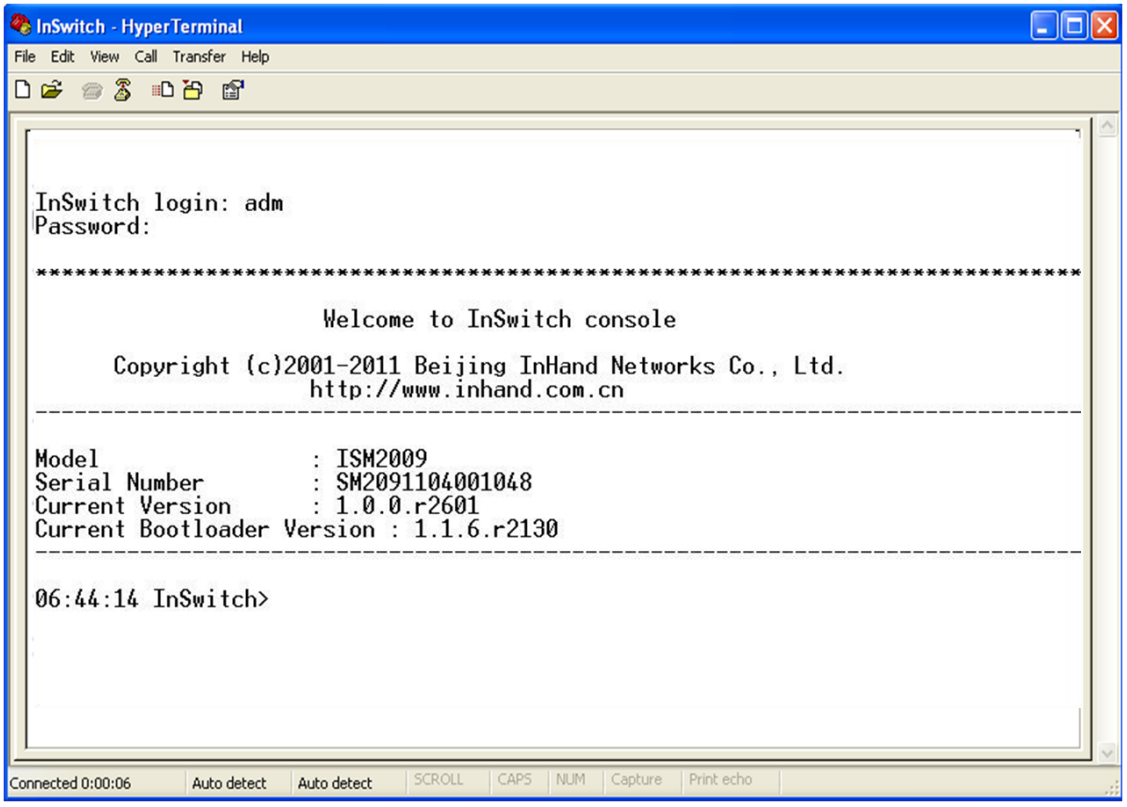
Data bit: 8 bits as default

Parity check: none as default

Stop bit: 1 bit as default

Data flow control: none as default

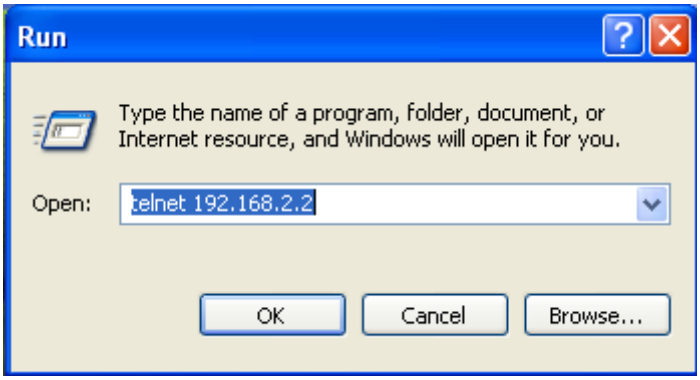
5) Input username and password in the hyper terminal window. The default username and password of InSwitch are adm/123456. Then you will login serial port console.



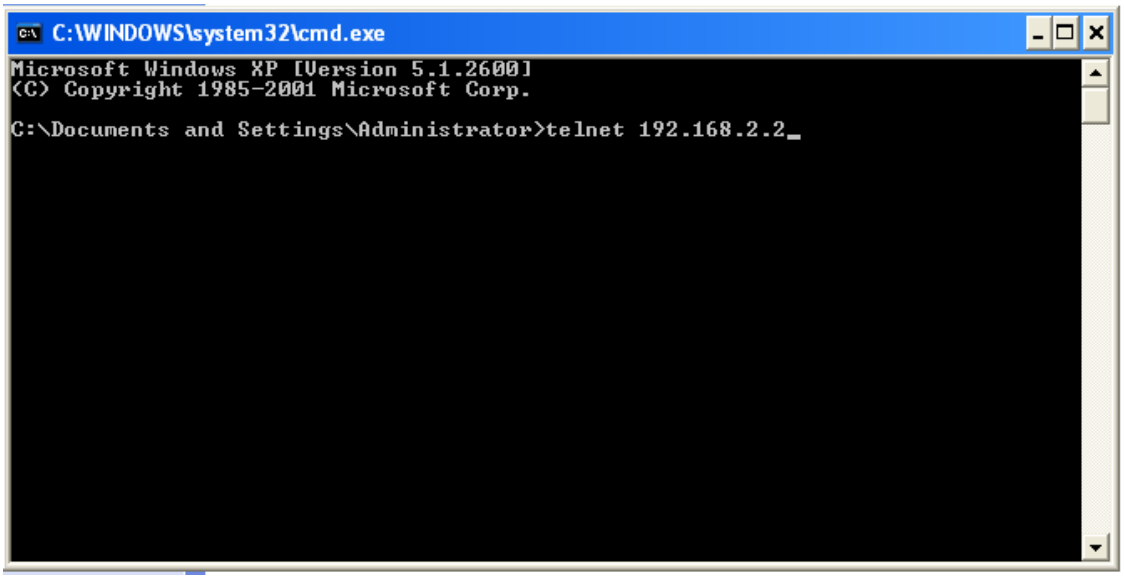
2.3 Telnet Configuration

Please follow steps as below:

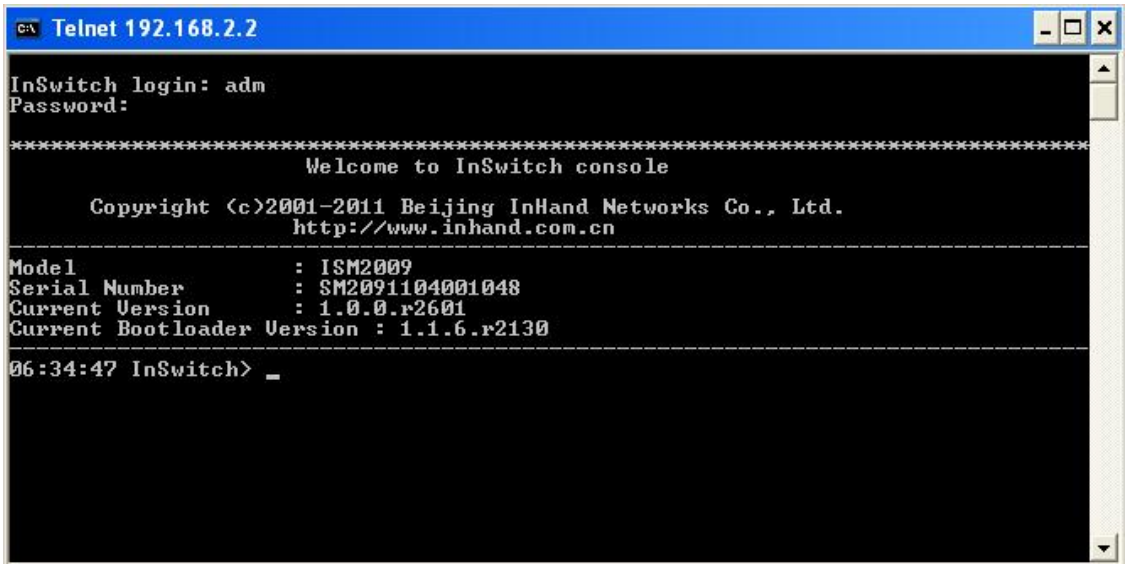
1) Click “Start” -> “Run”, then input InSwitch IP address that you want to connect.

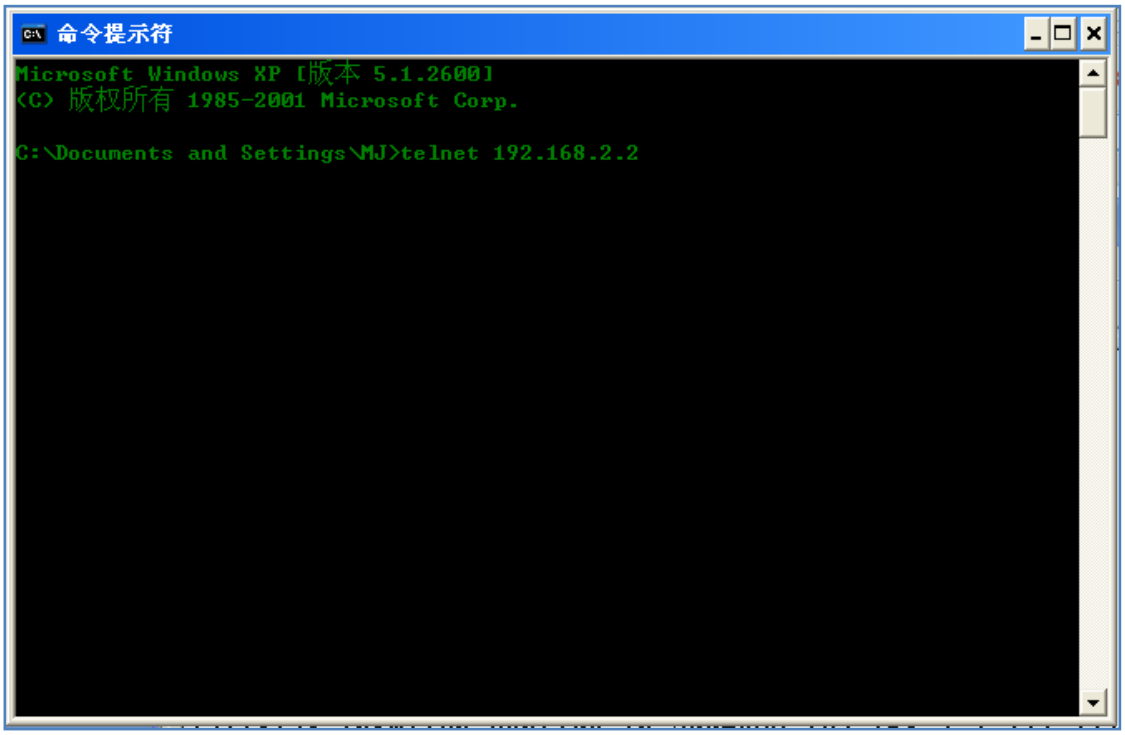


You could also input telnet command in MS-DOS.



2) After enter command prompt, input username and password (adm/123456 as default) to login InSwitch telnet console interface.



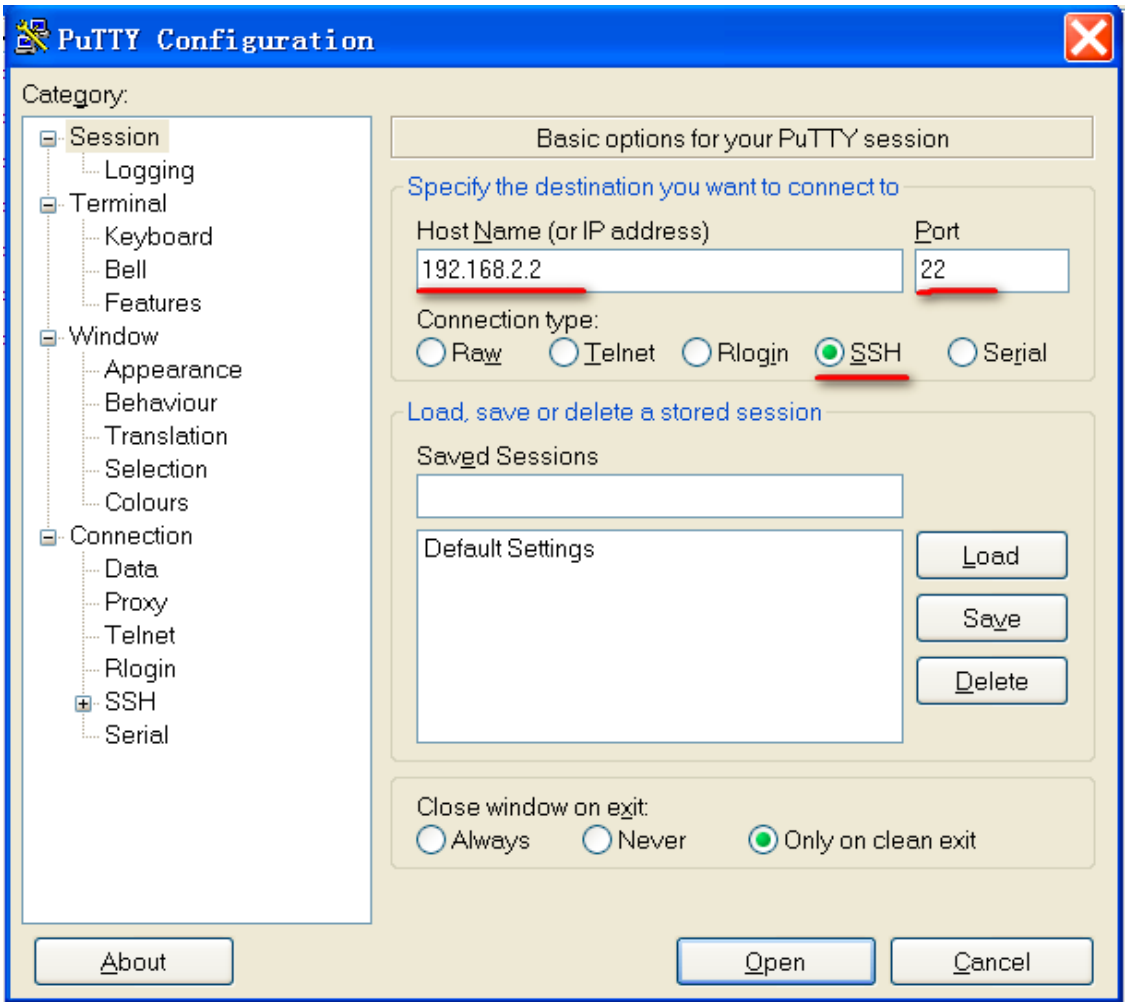


2.4 SSH Configuration

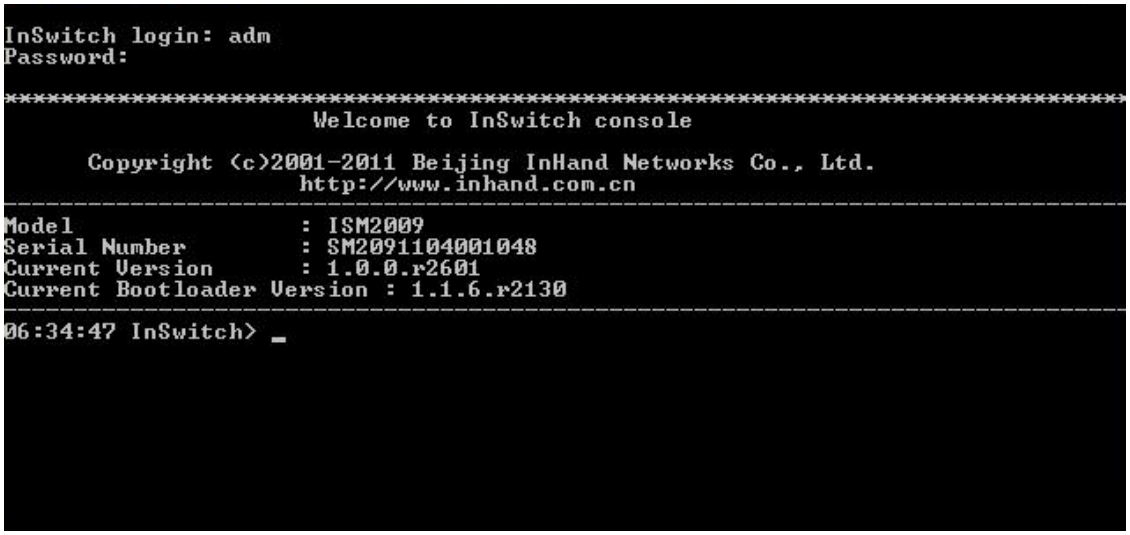
Please follow steps as below:

1) Login the Switch through Web Explorer, for example IE browser. Then enable SSH server function (refer to configure SSH server).

2) Using SSH Client to login Switch. Take PuTTY as example (PuTTY is a remote tools for free, it supports Telnet, SSH, rlogin protocols, in this case we will take Release 0.61 version). Open PuTTY, click “Session” in the categories, set configurations as picture below.



After setting, click “Open”, you will see the dialog box as below, input username and password (adm/123456 as default). Then, you will enter Switch console interface.



3 Web Configuration

3.1 Administration

This chapter introduce system management, Administration settings include the 10 settings: system, networks, system time, admin access, config management, SNMP, alarm, log, upgrade, reboot。

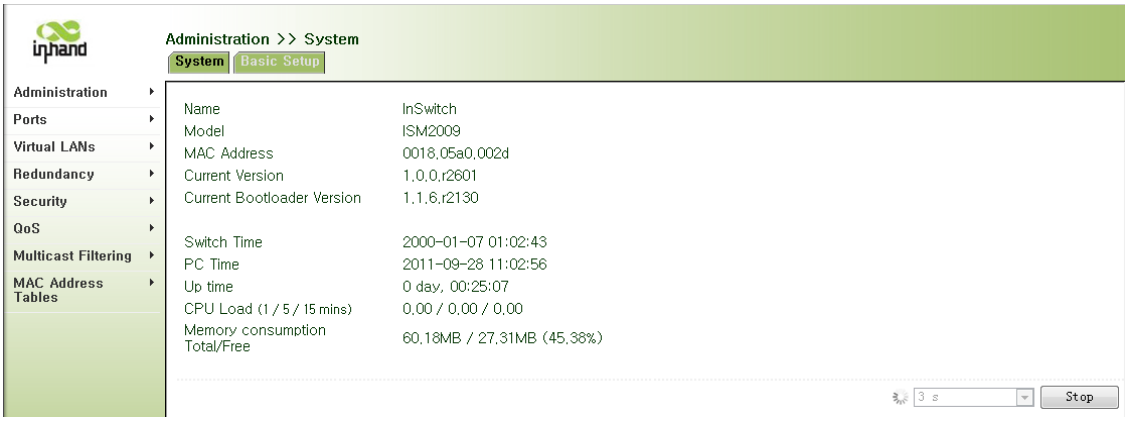
3.1.1 System

In the “System Status” web, you can check system’s basic information and running status information.

In the “Basic Settings” web, you can set system’s basic configuration, including system language and host name.。

3.1.1.1 System Staus

Click “configuration->system” in the navigation bar, enter “system status” web.



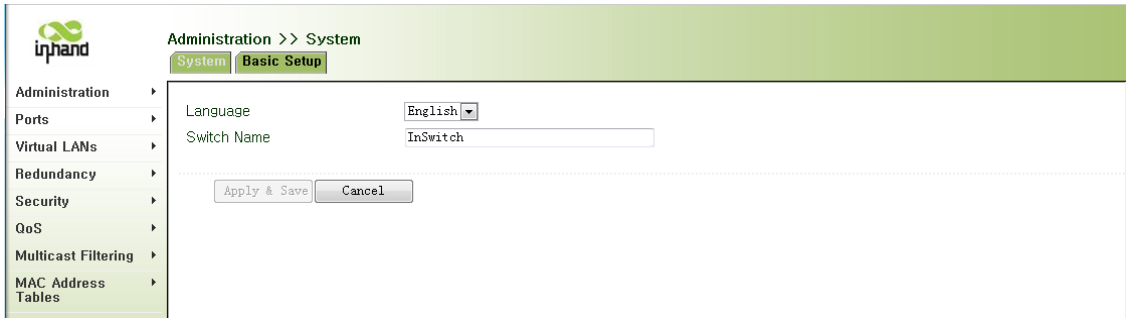
Page information description is as shown in the following table.

Parameters Name	Description	Default
Name	Switch host name	none
Model	Switch model	none
Serial NO.	Switch serial number	none
MAC address	Switch MAC address()	none
Current version	Switch firmware number	none
Current Bootloader	Switch bootloader version number	none

version		
Switch time	Switch system time	none
Host time	Visit host system time through web interface	none
Start time	Running time from start to current	none
CPU load (1/5/15 minutes)	CPU average load	none
Memory gross/remaining	Switch gross memory and remaining memory	none

3.1.1.2 Basic Setup

Click “management-> system” in the navigation bar, then enter “Basic Setup” interface.



Page information description is as shown in the following table.

Name	Description	Default
language	Switch system language	English
Switch Name	Switch host name	InSwitch

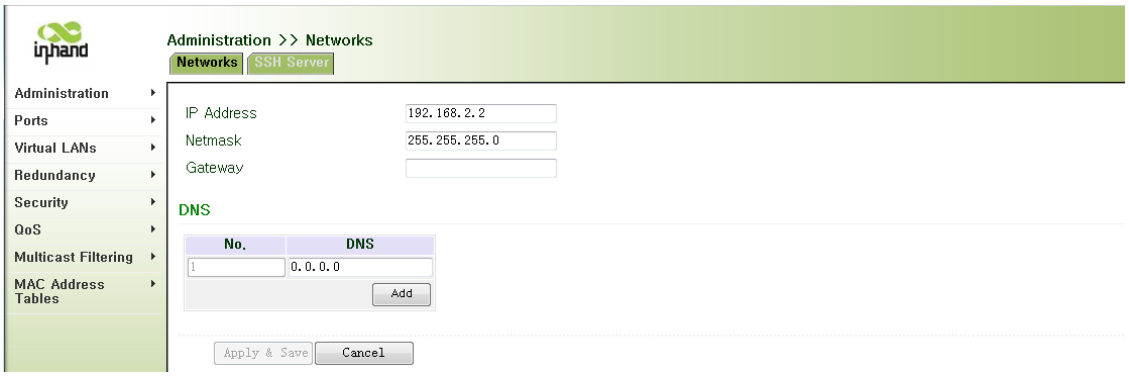
3.1.2 Networks

In the “Networks” interfaces, you can configure switch’s IP address and gateway, configure DNS server.

In the “SSH server” interfaces, you can configure SSH server’s parameters。

3.1.2.1 Configure Networks

Click “management->networks” in the navigation bar, then enter “networks interface”.



Page information description is as shown in the following table.

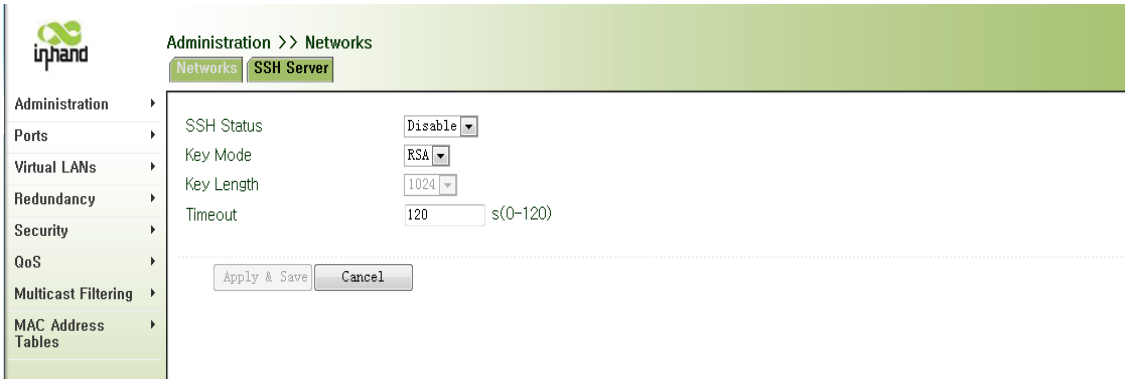
Name	Description	Default
IP address	Switch IP address	192.168.2.2
Subnet Mask	Switch subnet mask	255.255.255.0
Gateway	Default gateway	None
DNS	DNS server’s IP address, you can input 6 DNS server at most	none

Instruction

When fill multiple DNS, system will poll all the DNS server, until find available DNS server.

3.1.2.2 Configure SSH Server

Click “management->networks” in the navigation bar, then enter “SSH server” interface.



Page information description is as shown in the following table.

Name	Description	Default
SSH status	Enable or disable SSH server	Disable
Code mode	Set PKI encryption mode(only support RSA)	RSA
Length o f key	Set length of key, it could be 512 or 1024	None
overtime	SSH overtime, SSH server will be disconnected when the server client has no operation.	120

3.1.3 System Time

3.1.3.1 Configure System Time

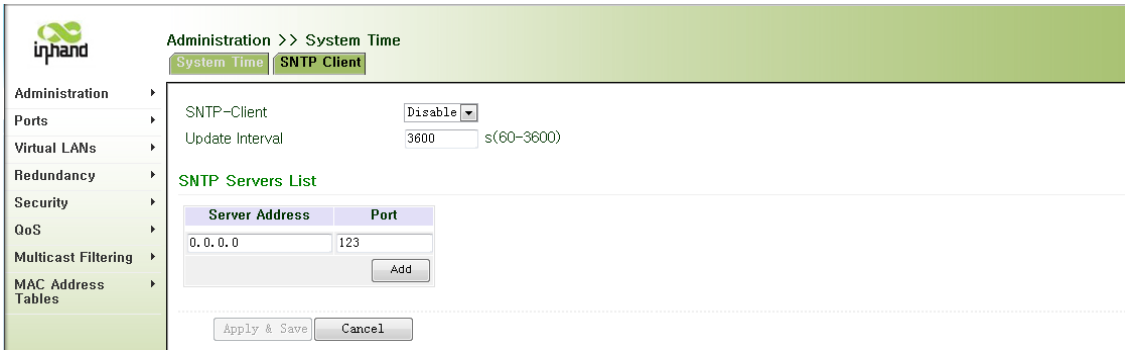
Click “management->system time” in the navigation bar, enter “system time” interface. Then button “synchronous time ” will help user synchronize switch system time with host time. Configure parameter in the box “Year/Month/Date”, “Hour:Min:Sec”. Then click “Apply”.

Page information description is as shown in the following table.

Name	Description	Default
Switch time	Switch system time	none
Host time	Visit switch's host system time through web interface	none
Year/Month/Day	Year, Month, Day part of time	Current year, month, day
Hour:Minute:Second	Hour, Minute, second part of time	Current hour, minute, second
Time zone	System time zone	UTC+08:00

3.1.3.2 SNTP Client

Click "management->system time" in the navigation, then enter "SNTP Client" interface.



Page information description is as shown in the following table.

Name	Description	Default
SNTP Client	Enable or disable SNTP Client	disable
Update Interval	The interval between switch and SNTP Server synchronous time	3600
SNTP Servers list	SNTP Server list, you can input 10 server at most	none
port	The port of SNTP Server	123

Attention

Before setting SNTP Server, please ensure SNTP server could be accessed. Especially, when SNTP server's IP is domain name, please ensure that you have already configured correct DNS server.

Instruction

When setting multiple SNTP server, system will poll all the SNTP server, until find available SNTP server.

3.1.4 Admin Access

Admin access supply user's management. The user was divided into super user and normal user.

Super user: there is only one super user created by system, username is adm. No limitation in visiting switch

Normal user: created by super user, you can check switch configuration but no right to change.

3.1.4.1 Create User

Click "management->admin access" in the navigation, enter "create a user".

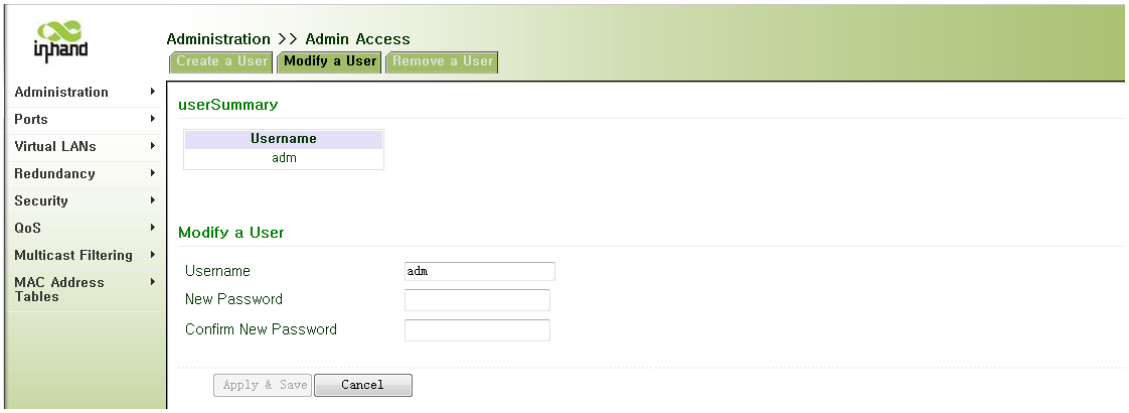
Page information description is as shown in the following table.

Name	Description	Default
Username	New user's username	none
New password	New user;s login password	none
Confirm new password	Confirm the new password	none

User summary	List of current users	none

3.1.4.2 Modify a User

Click “management->admin access” in the navigation bar, enter “modify a user” interface.

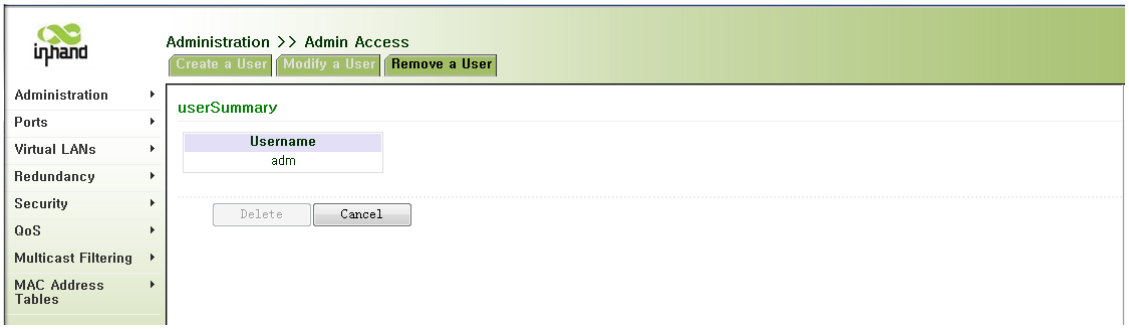


Page information description is as shown in the following table.

Name	Description	Default
Username	New user’s username	none
New password	New user;s login password	none
Confirm new password	Confirm the new password	none
User summary	List of current users	none

3.1.4.3 Remove a User

Click “management->Admin access” in the navigation bar, then enter “Remove a User”.



Page information description is as shown in the following table.

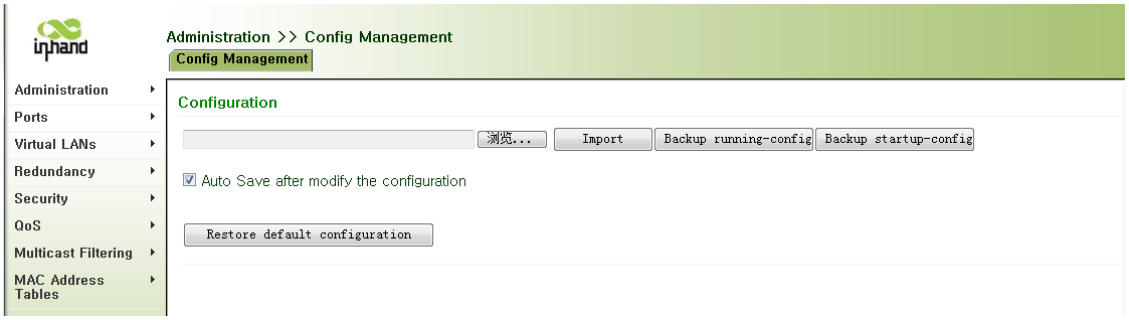
Name	Description	Default
User summary	List current system users	none

Instruction

Attention: super user's username "adm" could not be modified or removed.

3.1.5 Configuration management

Click "management->config management" in the navigation bar, enter "config management".



Page information description is as shown in the following table.

Name	Description	Default
Browser	Choose config files from PC	none
Import	Import config files to switch's startup-config	none
Backup running-config	Backup running-config to PC	none

Backup startup-config	Backup startup-config to PC	none
Auto save after modify the configuration	Decide whether or not to save configuration automatically after modifying configuration.	enable
Restore default configuration	Restore Startup-config to default configuration	none

Attention

When import the configuration, the system will filter incorrect configuration files, and save the correct configuration files, when system restarts, it will orderly execute theses configuration files. If the configuration files didn't be arranged according to effective order, the system won't enter the desired state.

Instruction

In order not to affect the current system running , after executing the import configuration and restore the factory configuration, need to reboot the switch, then the new configuration will take effect

3.1.6 SNMP

SNMP, Simple Network Management Protocol, is the most widely used network management protocol. SNMP is used in device management, to ensure that management information between any two points in the network transportation and make network manager check and manage device information easily.

SNMP is divided into NMS and Agent

NMS (Network Management Station) is running client procedure work station.

Agent is a server software that running in the device.

SNMP Agent support SNMPv1, SNMPv2c and SNMPv3 in the current device.

SNMPv1 and SNMPv2 use community name to authenticate.

SNMPv3 use username and password to authentication encryption mode.

SNMP includes NMS and Agent:

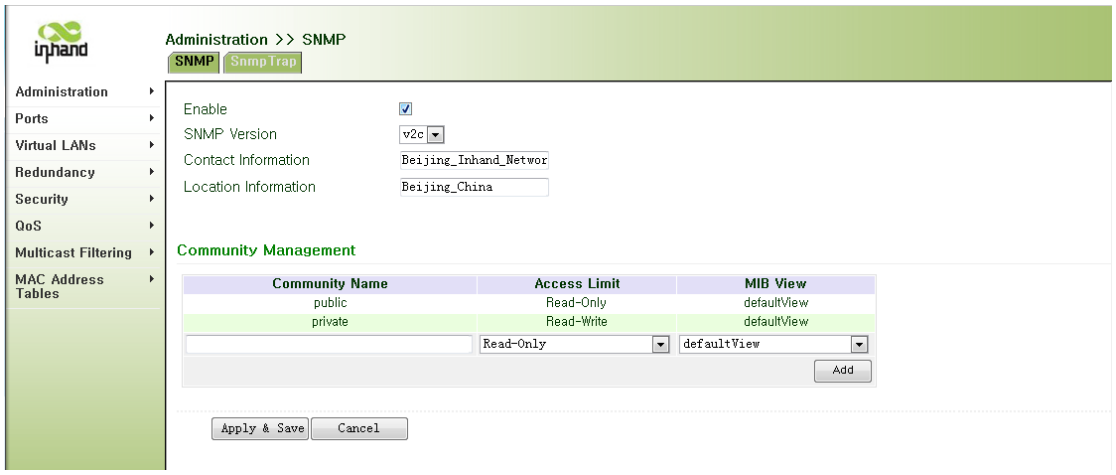
- NMS (Network Management Station) is a station which runs client procedure.
- Agent is service software which is running in device.
- The purpose of NMS and Agent is as followed:
- NMS can send getRequest, getNextRequest, setRequest packets to Agent, when the Agent receive these packets, it will execute read or write operations according to the type of packet and create Response packet back to NMS.
- When device happens to status change (for example port plug), Agent will send Trap packet and report all the events to NMS.

SNMP agent of device supports SNMPv1, SNMPv2 and SNMPv3 at present.

- SNMPv1 and SNMPv2 adopt community name to authenticate.
- SNMPv3 adopt username and password to authenticate.

3.1.6.1 Configure SNMP

Click “manage->SNMP” in the navigation bar, then enter “SNMP” interface.



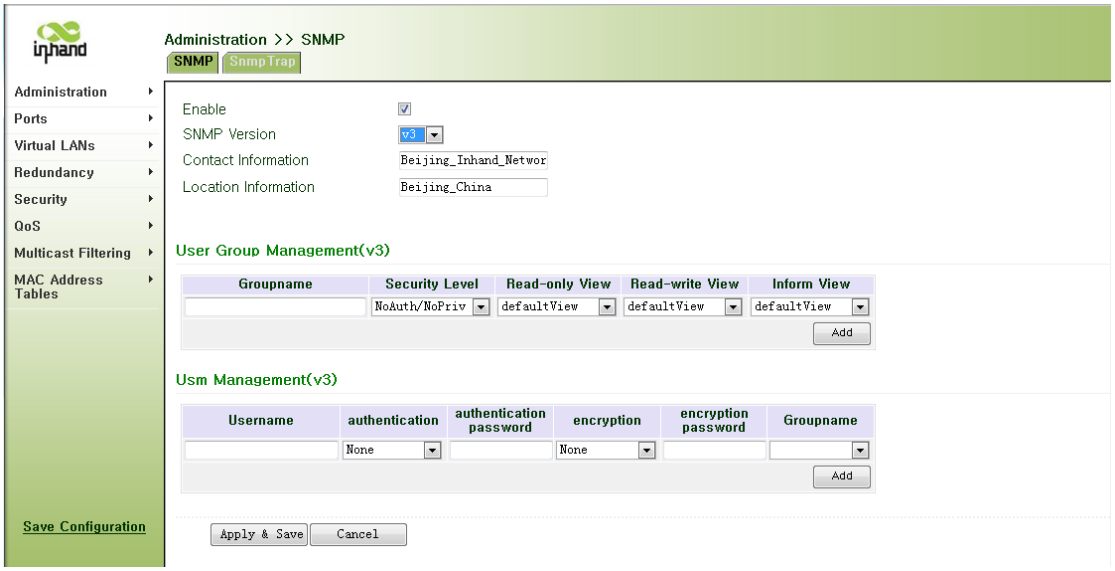
Page information description is as shown in the following table.

Name	Description	Default
Enable	Enable or disable SNMP	off
SNMP Version	Choose switch SNMP version, support SNMP v1/v2/v3	v2c
Contact Information	Input contact information	Beijing_Inhand_Network
Location Information	Input location information	Beijing_China

Name	Description	Default
Group name	Enable or disable SNMP	Public and private

Access authority	Choose access authority	ro
MIB view	Choose MIB view	Default view

After choosing SNMPv3, you need to configure users and user group:



Page information description is as shown in the following table.

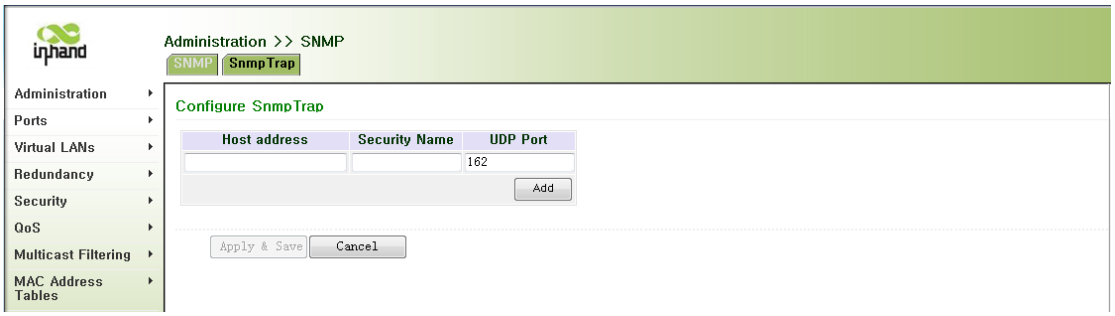
Name	Description	Default
Group name	Input group name, length:1-32 character	none
Security level	Choose security level	No Auth/No private
Read-only view	Choose SNMP read-only view. Only support default view now.	Default view
Read-write view	Choose SNMP write-only view. Only support default view now.	Default view
Inform view	Choose SNMP Inform view. Only support default view now.	Default view

Name	Description	Default
username	Input username, length:1-32 character	none
authentication	Choose authentication mode. Support MD5 and SHA authentication mode.	none

Authentication password	Input password	none
Encryption	Whether or not to use DES encryption mode	DES
Encryption password	Input password when the mode of encryption is not “no encryption”. Length: 8-32 character	none
Group name	Add user to their group.	none

3.1.6.2 Configure SNMP Trap

Click “management->SNMP” in the navigation bar, then enter “SNMP Trap” interface.



Page information description is as shown in the following table.

Name	Description	Default
Host IP address	Input NMS IP address	none
Security Name	For v1 or v2, input group name; For v3, input username. Length:1-32 characters.	none
UDP Port	Input UDP port	162

3.1.7 Alarm

Alarm feature provides a way to inform switch exception immediately, allowing users to find out and solve these exceptions as soon as possible. When an exception occurs, switch will issue a warning, then user can select exceptions system-defined and

choose the appropriate notice way to inform what happened. All alarms will be recorded in the alert log for users.

According to the type of alarm, it can be divided system alarm and port alarm.

- System Alarm: It produces because of system or environment happened to some exception, divided into temperature, hot start, cold start, power failure, power recovery, insufficient memory.
- Port Alarm: It produces because of the network interface is up or down, divided into LINK-UP, LINK-DOWN.

Alarm status divided into “raise”, “confirm”, “all”.The state of "raise" that means the alarms hadn’t been confirmed, if user cann’t resolve these alarms temporarily, he can set them to “confirm”state. The state of “all” means all the alarms

Alarm level can be divided:

- EMERG：Device occurs some faults, it could lead to the system restart.
- CRIT：Device occurs some faults which are unrecoverable.
- WARN：Device occurs some faults which could affect system function.
- NOTICE：Device occurs some faults which could affect system properties.
- INFO：Device occurs some normal events.

On the “Alarm Status” page, you can view all the alarms since system was power on.

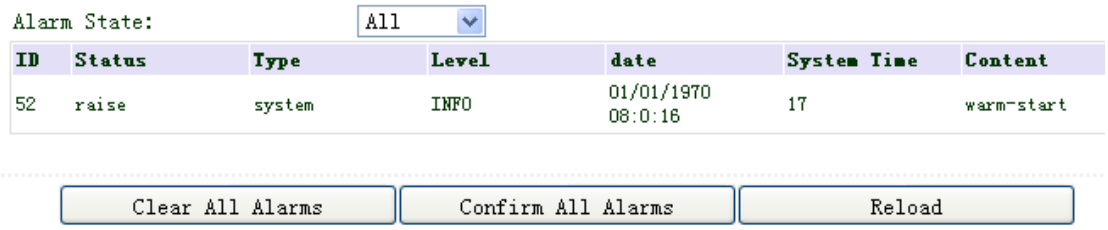
On the “Alarm Input” page, you can define alarm types which you concern.

On the “Alarm Output” page, you can set the way of alarm notice, including relay and Email, log record is a default output way.

On the “Alarm Map” page, you can map the alarm type which you concern to one or more alarm notice way.

3.1.7.1 Alarm Status

Click on **Administrator → Alarm→ Alarm Status,** as the following shown:

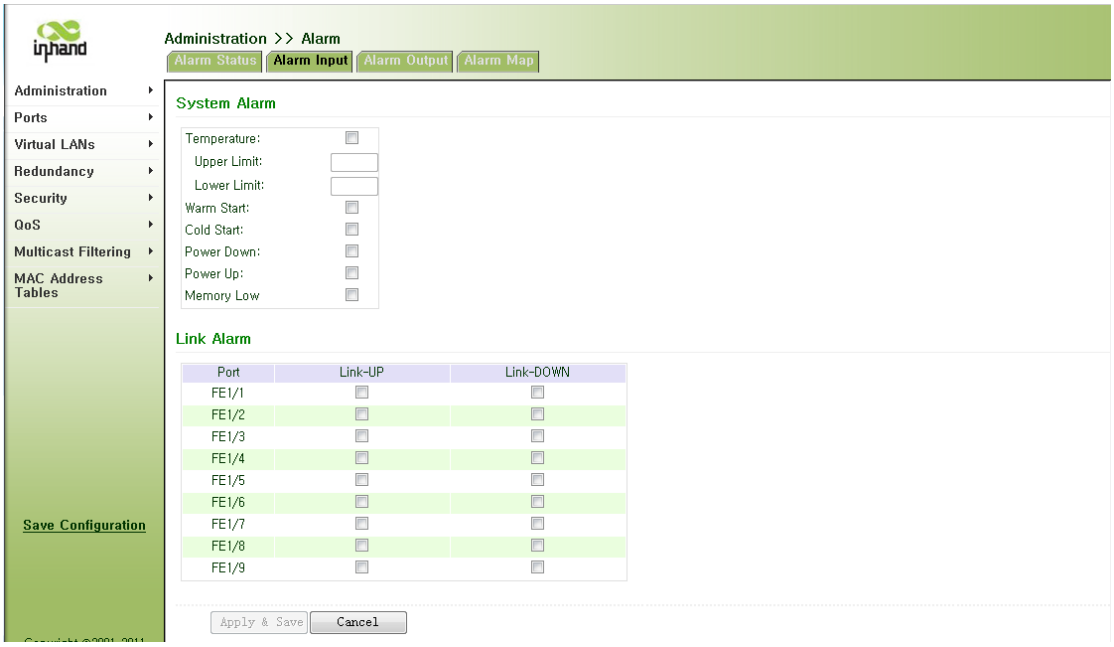


Page information description is as shown in the following table.

Name	Description	Default
ID	Generated by system	none
Status	Current alarm status	none
Type	Current alarm type	none
Level	Current alarm level	none
date	The time of generated alarm	none
System Time	The time from startup to alarm	none
Content	Description of alarm	none

3.1.7.2 Alarm Input

Click "**Administrator → Alarm→ Alarm Input**" in the navigation bar, then enter "Alarm Input".

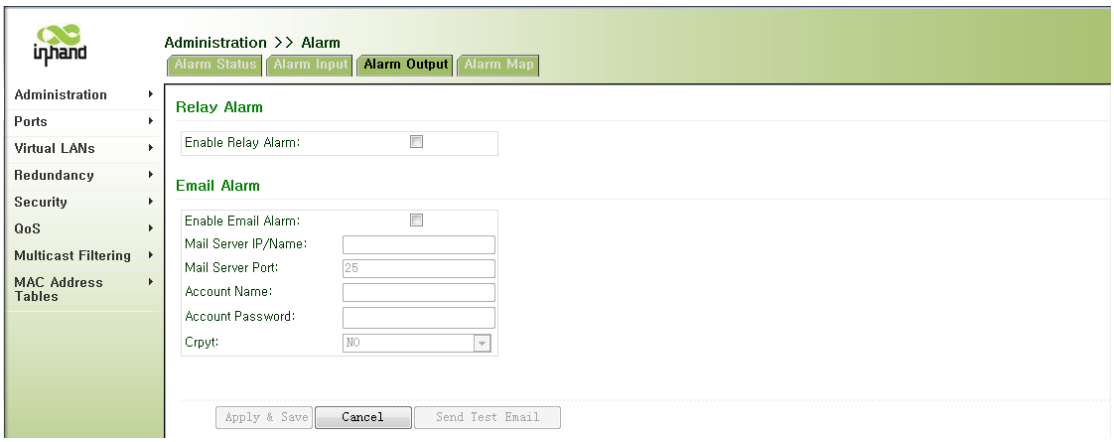


Page information description is as shown in the following table.

Name	Description	Default
Temperature	On/Off Temperature exceeding alarm	Off、
Upper Limit	Temperature upper limit	none
Lower Limit	Temperature lower limit	none
Warm Start	On/Off warm start alarm	on
Cold Start	On/Off cold start alarm	on
Power Down	On/Off power down alarm	on
Power Up	On/Off power up alarm	on
Memory Low	On/Off memory low alarm	on
Link-up	On/Off link-up alarm	off
Link-down	On/Off link-down alarm	on

3.1.7.3 Alarm Output

Click “Administration->Alarm” in the navigation bar, then enter “alarm output”



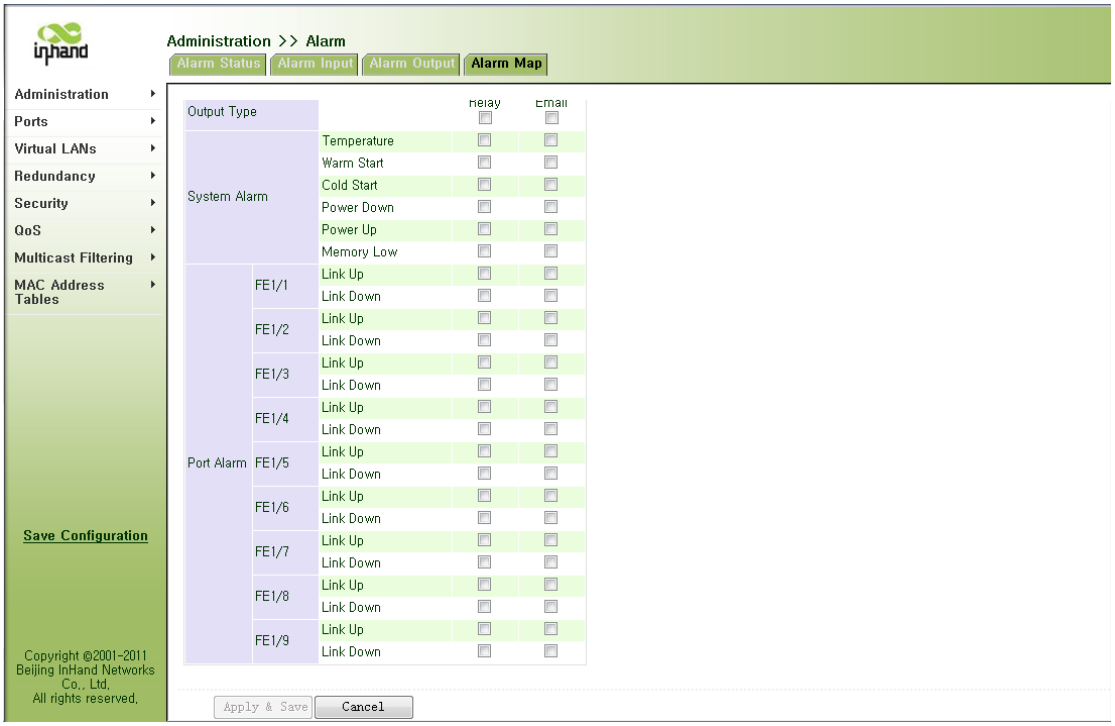
Page information description is as shown in the following table.

Name	Description	Default
Enable Relay Alarm	Enable/disable relay alarm	disable
Enable Email Alarm	Enable/disable Email alarm	disable
Mail Server IP/Name	Set mail server IP address	none
Mail Server Port	Set mail server port	25
Account Name	Set email address which system sent alarm Email	none
Account Password	Set email password which system sent alarm Email	none
encryption	Set encryption mode	none

Attention: After setting Email parameter, you should click "sent test mail" to sent test Email, to ensure that configuration is correct.

3.1.7.4 Alarm Map

Click "Administration->alarm" in the navigation bar, then enter "alarm map" interface.



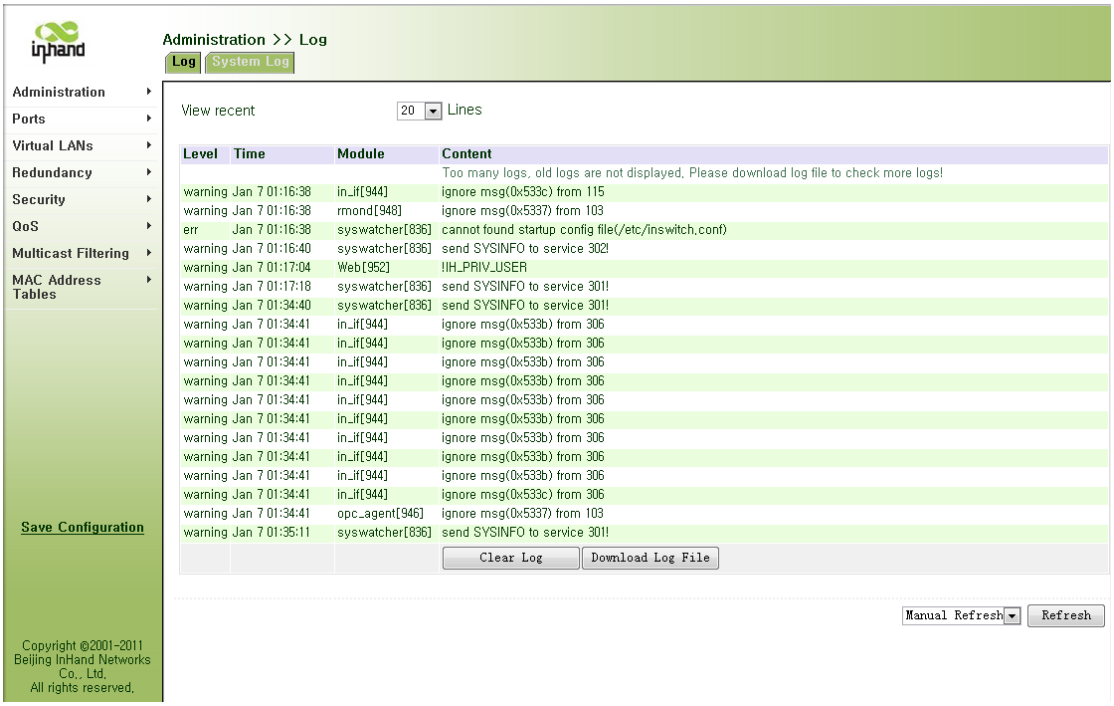
3.1.8 System Log

Through “System log” interface, you can see important log since the start of switch. It easy to understand system status and will help solve problem in time.

Through “System log” interface, you can set up remote log server, switch will take all system log files to upload remote server, which requires remote log software (such Kiwi Syslog Daemon).

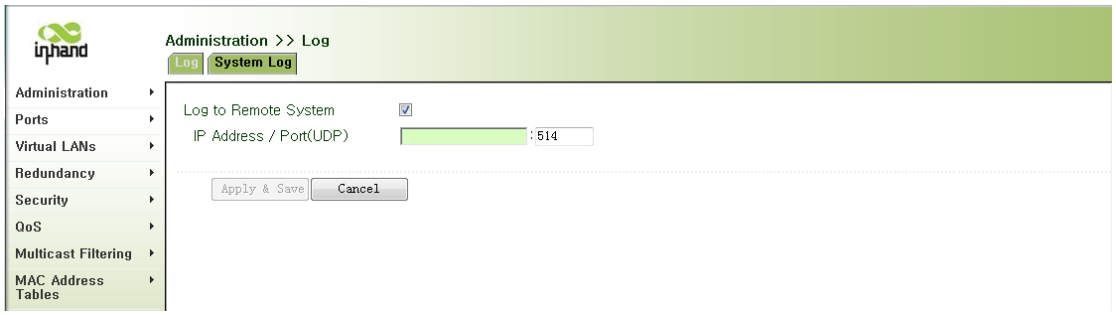
3.1.8.1 Log

Click “Administration->System log” in the navigation bar, then enter “system log” interface.



3.1.8.2 System Log

Click “Administration->system log” in the navigation bar, then enter “system log” interface.



Page information description is as shown in the following table.

Name	Description	Default
Log to remote system	On/Off remote log function	disabled
IP Address/Port(UDP)	Set remote server IP/port	none

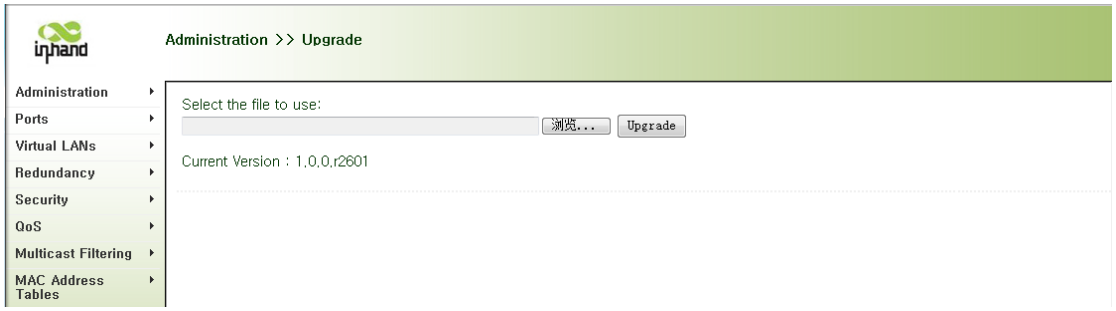
3.1.8.3 Kiwi Syslog Daemon

Kiwi Syslog Daemon is a free log server software which is used for Windows. It can receive, record, display the log information of host(such as router, switch, Unix

host). After download and install Kiwi Syslog Daemon, configure necessary parameters on the configuration page of File->Setup->Input->UDP.

3.1.9 System Upgrade

Click “Administration->system upgrade” in the navigation bar, then enter “system upgrade” interface.



Click on “browser” button and select upgrade file, then click “upgrade” start to upgrade. The process will be lasted around 1 minute, after finishing, reboot switch.

3.1.10 Reboot

Click “Administration->reboot” in the navigation bar, then enter “reboot” interface.

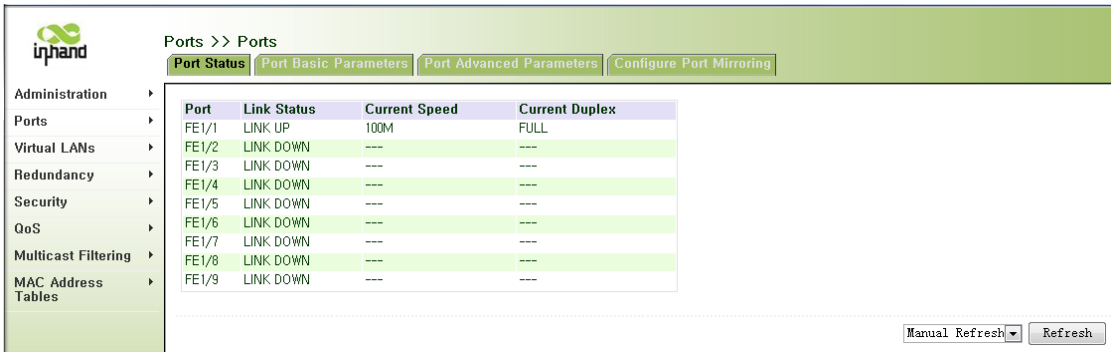
3.2 Ports

3.2.1 Ports

Port configuration incudes port status, port basic parameters, port advanced parameters, port mirror.

3.2.1.1 Port Status

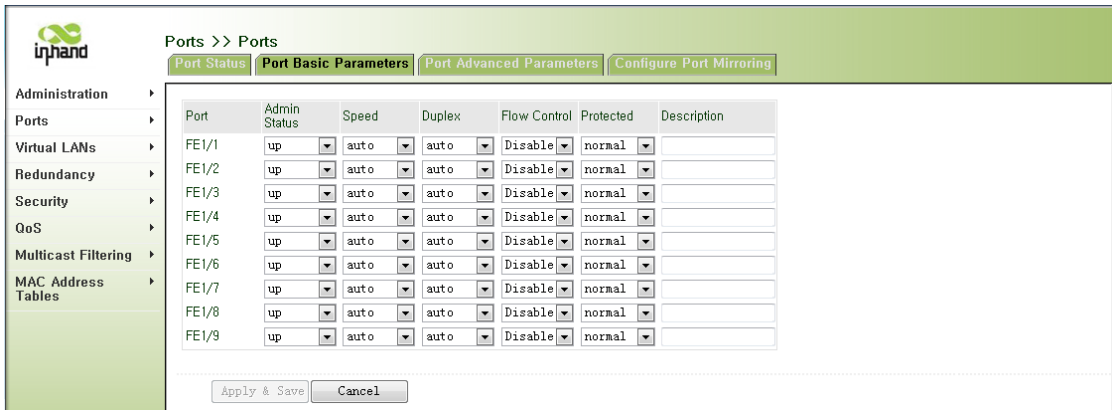
Click “Ports->Ports” in the navigation bar, then enter “Port Status” interface.



This page displays port status, includes port number, link status, current speed, current duplex.

3.2.1.2 Configure Port Basic Parameters

Click “Ports->Ports” in the navigation bar, then enter “Port Basic Parameters”.

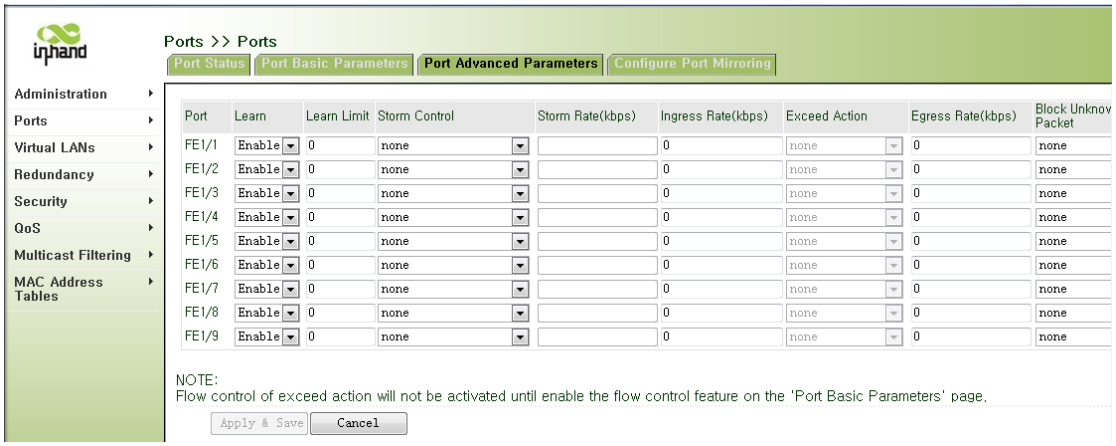


Page information description is as shown in the following table.

Name	Description	Default
Admin Status	Up(enable), Down(disable)	up
Speed	10M,100M,1000M or Auto	auto
Duplex	Half, full or auto	auto
Flow Control	Enable, disable	disable
Protected	Normal, isolated	normal
Description	The description of ports	none

3.2.1.3 Port Advanced Parameters

Click “Ports->Ports” in the navigation bar, then enter “Port Advanced Parameters” interface.



Page information description is as shown in the following table.

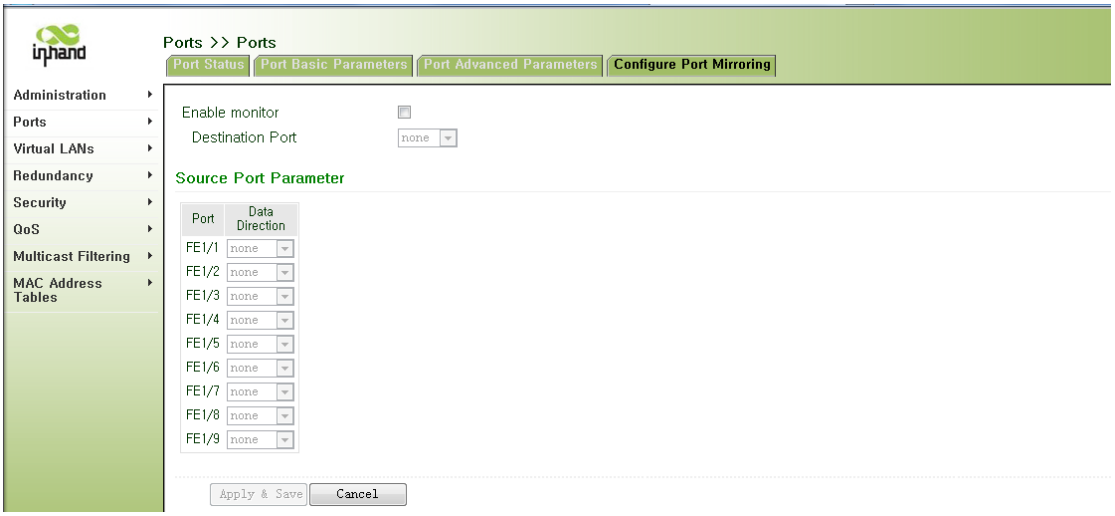
Name	Description	Default
Enable monitor	Enable or Disable	Disable
Destination port	Mapping destination port	none
Source port parameter	Appointed mapping port and mapping direction, mapping direction could choose: none, ingress, egress, both	none

Name	Description	Default
Leaning Status	Enable，Disable	Enable
The MAX Number	The max number of dynamicaly learning MAC address. Range <1-255>	none
Broadcast Control	That means which types broadcast will be limited. The type is as followed: none unicast multicast broadcast unicast& multicast unicast& broadcast multicast& broadcast	none

	all	
Broadcast rate(kbps)	Desigate broadcast flow rate limit, range is 64-1000000	none
Infow rate(kbps)	Infow rate limit, range<64-1000000>	none
Excessive treament	When inflow rate over the limit, the treatment can be: Drop, Flow-control,	drop
Outflow rate (kbps)	Outflow limit，range<64-1000000>	none
Block unknown packets	Blocking unknown packets. The flowing type can be choosed: none， unicast， multicast， both(unicast or multicast)	
Drop packet type	Drop the received packets，the flowing packet type can be choosed none， tagged， untagged	none
VLAN transparent transmission	In normal case, if the vlan id which port belongs to is not same with the vlan id of received packets carry. The packet will be droped, but if enable the vlan transparent trasnmissoin, the packet won't be droped.	Disable

3.2.1.4 Configure Port Mirrioring

Click "Ports->Ports" in the navigation bar, then enter "configure port mirroring" interface.



The flow of ingress from source port FE1/2 and the flow of egress from source port FE1/3 was mapped to destination port FE1/1.

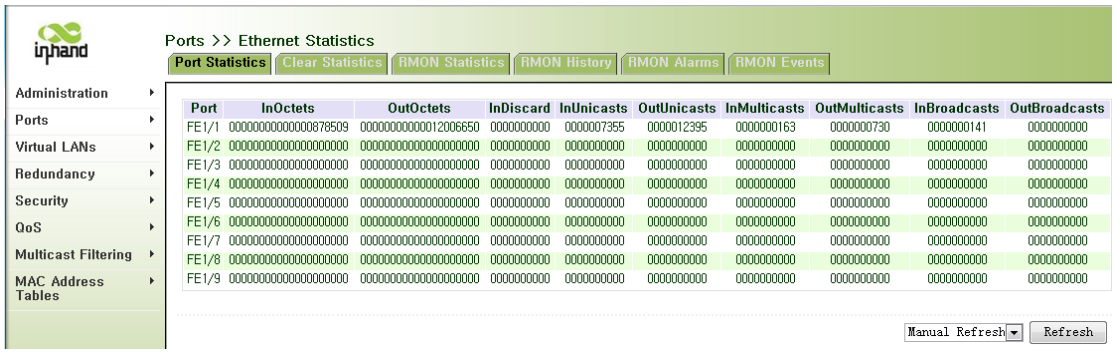
Page information description is as shown in the following table.

Name	Description	Default
Enable monitor	Enable or Disable	Disable
Destination port	Mapping destination port	none
Source port parameter	Appointed mapping port and mapping direction, mapping direction could choose: none, ingress, egress, both	none

3.2.2 Ethernet Statistics

3.2.2.1 Port Statistics

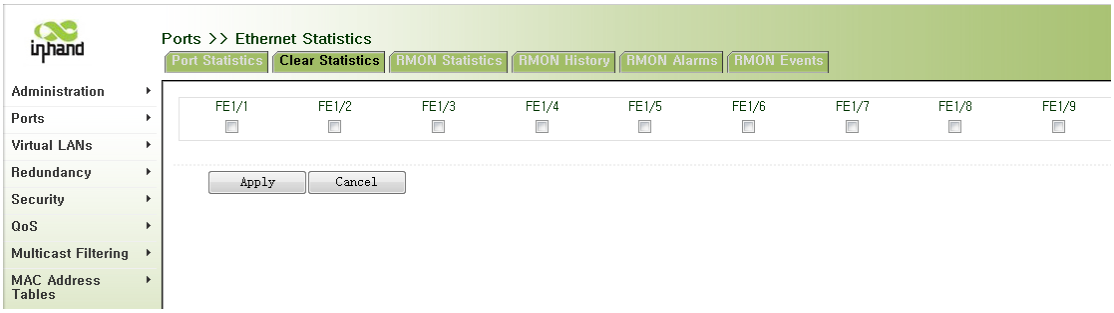
Click “Ports->Ethernet Statistics” in the navigation bar, then enter “Port Statistics” interface.



3.2.2.2 Clear Statistics

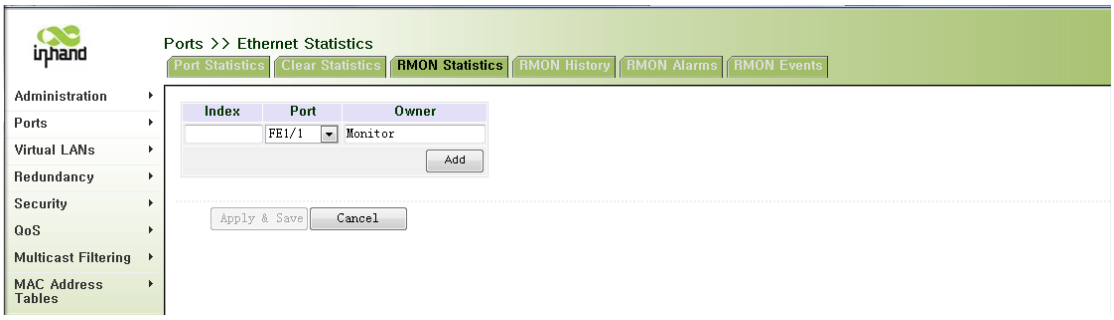
Click “Ports->Ethernet Statistics” in the navigation bar, then enter “Clear Statistics” interface.

In the table, it chooses port FE1/1 and FE1/2. The port information of statistics will be clear after applying.



3.2.2.3 RMON Statistics

Click “Ports->Ethernet Statistics” in the navigation bar, then enter “RMON Statistics” interface.

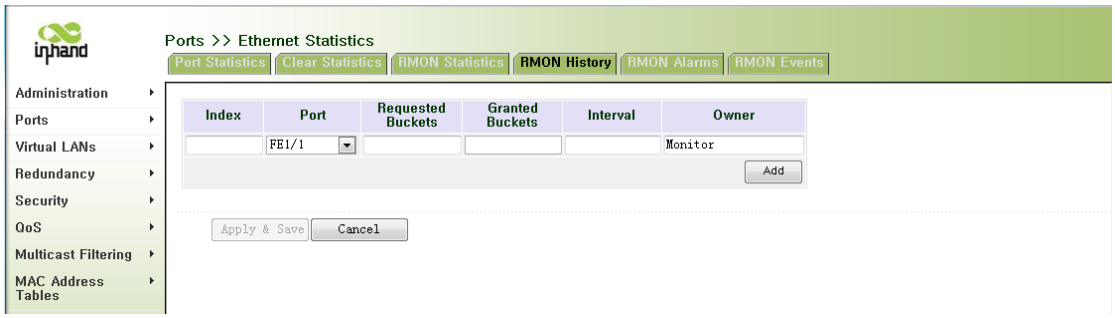


Page information description is as shown in the following table.

Name	Description	Default
Index	Input index number, range from 1-65534	none
Port	Input port number	FE1/1
Owner	Input owner’s name	Monitor

3.2.2.4 RMON History

Click “Ports->Ethernet Statistics” in the navigation bar, then enter “RMON History” interface.



Page information description is as shown in the following table.

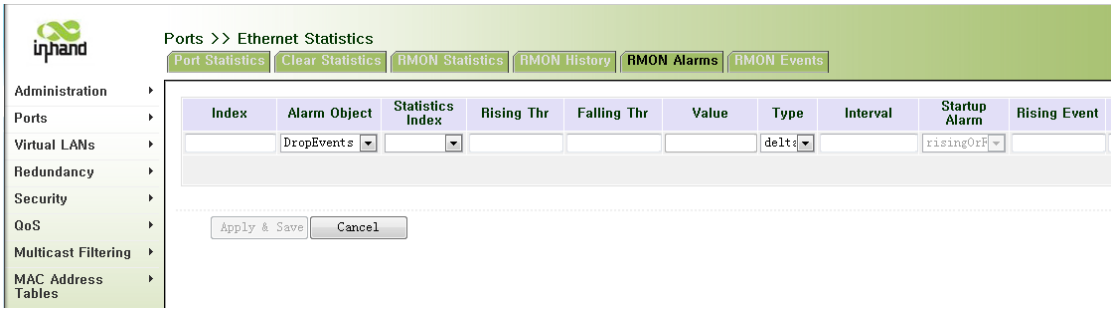
Name	Description	Default
Index	Input index number, range from 1-65535	None
Port	Choose port	FE1/1
Requested Buckets	Management station expected sampling gross	None
Granted Buckets	Device saved sampling gross	None
Interval	Sampling time(second)	None
Owner	Owner's name	Monitor

3.2.2.5 RMON Alarms

When the alarm is triggered, if you need to manage device(NMS) to send Trap messages, please ensure that SNMP function has been configured correctly before configuration of RMON alarm feature.

Statistics Section alarm variable is defined in the MIB variable, it must configure RMON Ethernet statistics under monitored Ethernet interface.

Click "Ports->Ethernet Statistics" in the navigation bar, then enter "RMON Alarm" interface.

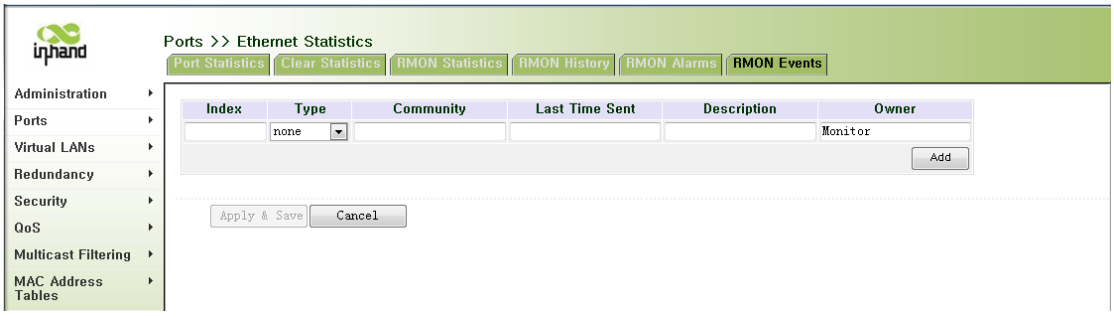


Page information description is as shown in the following table.

Name	Description	Default
Index	Input index number, range from 1-65535	None
Alarm Object	Choose the monitored RMON-MIB object	DropEvents
Statistics Index	Choose statistics index	None
Rising Thr	Input sampling statistics rising thr	None
Falling Thr	Input sampling statistics falling thr	None
Value	Monitor variable value	None
Type	Absolute or Delta	delta
Interval	Sampling time interval	None
Startup Alarm	Only support rising or falling	Rising or falling
Rising Event	When it exceeds rising limit, trigger rising event index	None
Falling Event	When it exceeds falling limit, trigger falling event index	None
Owner	Owner's name	Monitor

3.2.2.6 RMON Events

Click "Ports->Ethernet Statistics" in the navigation bar, then enter "RMON Events" interface.



Page information description is as shown in the following table.

Name	Description	Default
Index	Input index number, range from 1-65535	None
Type	Choose the type of triggered events: log, trap, log-trap, none	None
Community	Trap's group name(only for type log-trap and trap)	None
Last Time Sent	Record latest triggered event, generated by system	None
Description	Description of event	None
Owner	Owner's name	Moniter

3.2.3 Link Aggregation

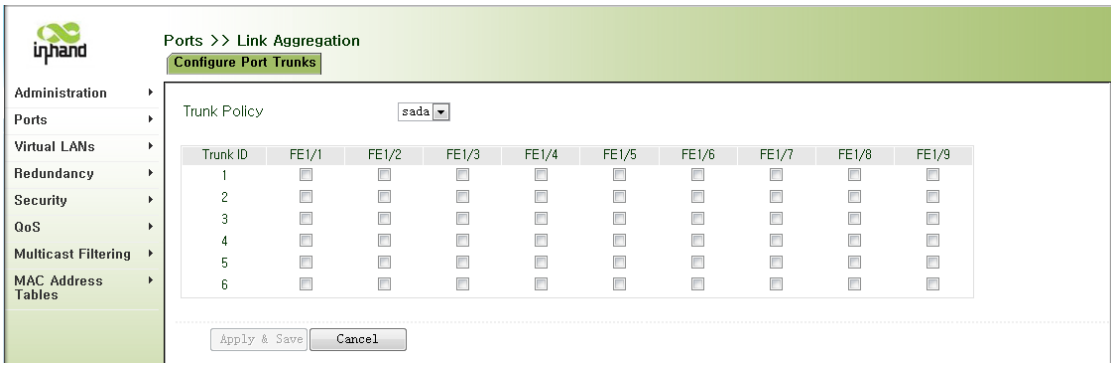
Link aggregation provides a mechanism to aggregate multiple physical ports into one logical link.

The advantage of link aggregation: linear increase bandwidth; link redundancy.。

3.2.3.1 Configure Port Trunk

Click "Ports->Link aggregation" in the navigation bar, then enter "Configure Port Trunks" interface.

Put FE1/1, FE1/2, FE1/3, FE1/4 into aggregation group Trunk 1.



Page information description is as shown in the following table.

Name	Description	Default
Policy	Load balancing strategy, you could choose: sada or hash.	sada
Trunk port	Appointed trunk member	None

3.3 Virtual LANs

VLAN can be flexible on the physical network into logical. It cannot communicate directly between different VLAN, which to some extent, to ensure data and information security. In addition, VLAN isolated broadcast domain, making the network efficiency can be improved. VLAN also provides simple and flexible management, the physical network could be divided into segments separated from each other.

- VLAN Frame Type

  Tagged Frame: Carrying the VLAN tag . TPID is 0x8100, the VID of TCI is 0;

  Priority Tagged Frame: TPID is 0x8100, the VID of TCI is 0.

  Untagged Frame: The frame except Tagged frame and priority tagged.

- VLAN Member Type

  Tagged Member，When the VLAN frame is sent from a member port, will bring the VLAN label, that is sending the Tagged frame.

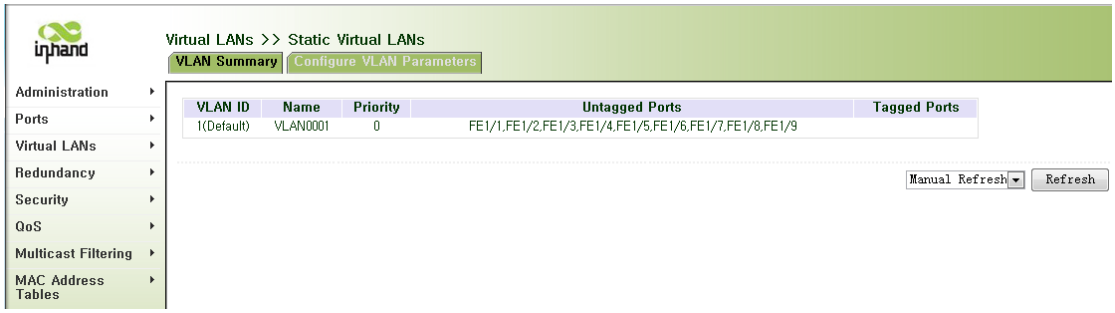
  Untagged Member, When the VLAN frame is sent form a member port, won't bring the VLAN label, that is sending the untagged frame.

- PVID

The default VLAN which port belong to.

3.3.1 VLAN Summary

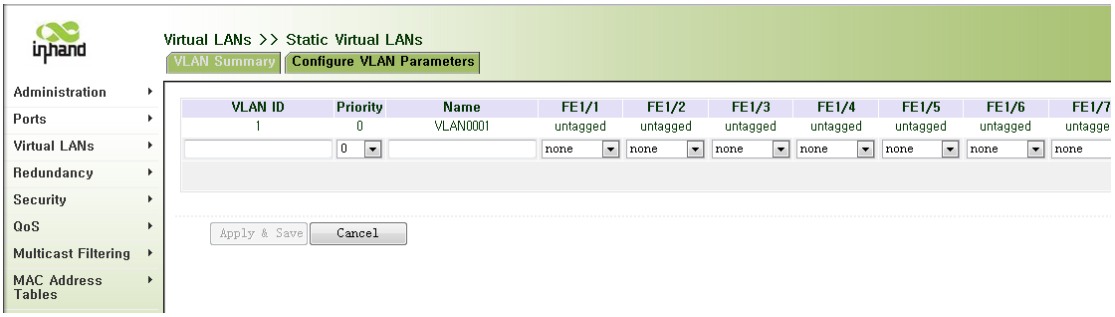
Click “Virtual LANs->Static Virtual LANs” in the navigation bar, then enter “VLAN Summary” interface.



3.3.2 Configure VLAN Parameters

Click “Virtual LANs->Static Virtual LANs” in the navigation bar, then enter “Configure VLAN Parameters” interface.

For example, VLAN ID is 2, name is test, FE1/1 and FE1/2 is untagged member, FE1/3 is tagged member.



Page information description is as shown in the following table.

Name	Description	Default
VLAN ID	VLAN ID, range from 1-4094	1
Priority	VLAN Priority, range from 0-7	0
Name	VLAN name	VLAN0001
Port member	Choose port member role, you could choose: none, tagged, untagged.	none

3.4 Redundancy

Redundancy, which is a part of the network circuit that has some malfunctions will have a backup path. This is the most basic requirements of industrial automation

applications. IEEE 802.1D Rapid Spanning Tree Protocol and ITU-T G8032 ring protection technology are the latest technology.

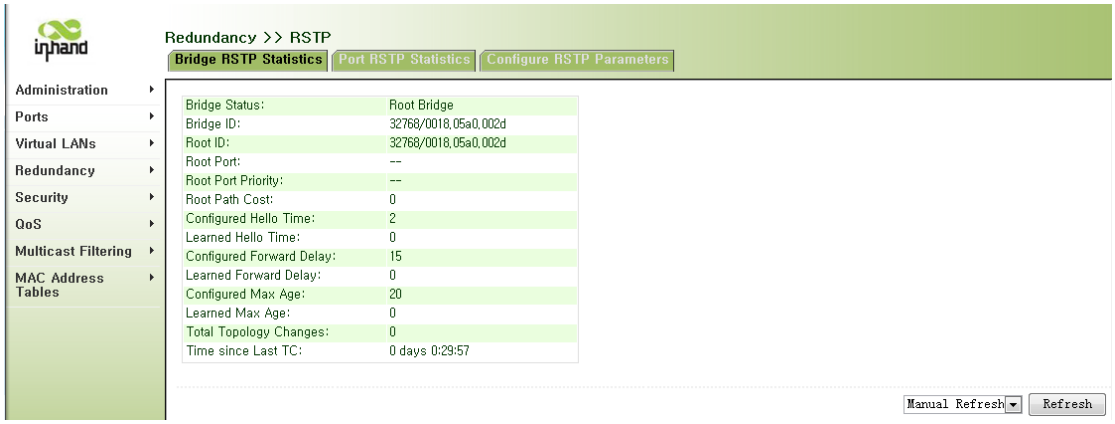
3.4.1 RSTP

The main role of the RSTP includes two aspects: first, by blocking the link to eliminate redundant network paths that may exist in loop; second, the current active path fails, the link activate redundant backup and restore network connectivity, enabling backup links.

RSTP, by sending a special packet protocol between switch each other, process received packet according to spanning tree algorithm, then determine the network topology.

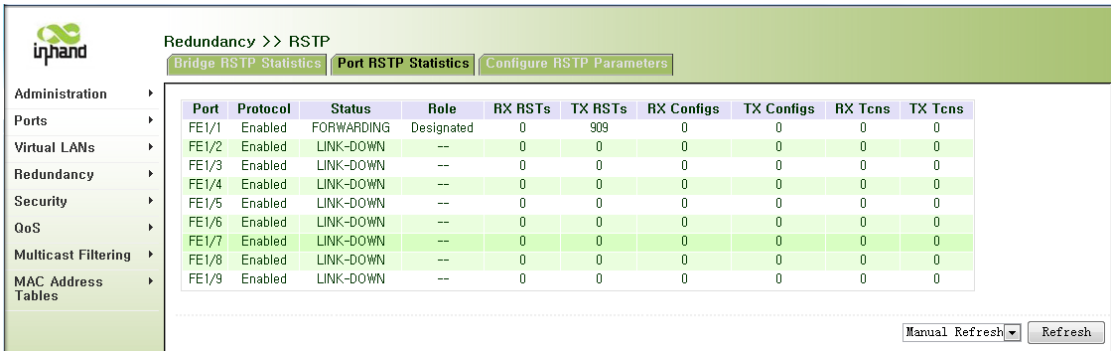
3.4.1.1 Bridge RSTP Statistics

Click “Redundancy-> RSTP” in the navigation bar, then enter “Bridge RSTP Statistics”.



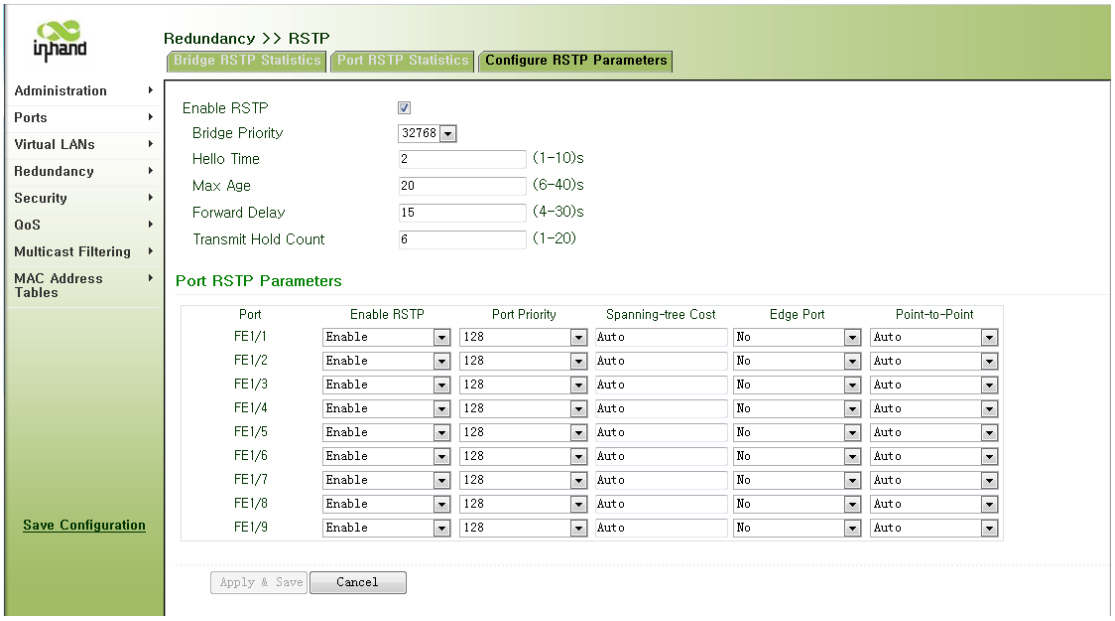
3.4.1.2 Port RSTP Statistics

Click “Redundancy-> RSTP” in the navigation bar, then enter “Port RSTP Statistics”.


Redundancy >> RSTP
Bridge RSTP Statistics
Port RSTP Statistics
Configure RSTP Parameters
Administration
Ports
Virtual LANs
Redundancy
Security
QoS
Multicast Filtering
MAC Address Tables
Port Protocol Status Role RX RSTs TX RSTs RX Configs TX Configs RX Tcns TX Tcns
FE1/1 Enabled FORWARDING Designated 0 909 0 0 0 0
FE1/2 Enabled LINK-DOWN -- 0 0 0 0 0 0
FE1/3 Enabled LINK-DOWN -- 0 0 0 0 0 0
FE1/4 Enabled LINK-DOWN -- 0 0 0 0 0 0
FE1/5 Enabled LINK-DOWN -- 0 0 0 0 0 0
FE1/6 Enabled LINK-DOWN -- 0 0 0 0 0 0
FE1/7 Enabled LINK-DOWN -- 0 0 0 0 0 0
FE1/8 Enabled LINK-DOWN -- 0 0 0 0 0 0
FE1/9 Enabled LINK-DOWN -- 0 0 0 0 0 0
Manual Refresh
Refresh

3.4.1.3 Configure RSTP Parameters

Click “Redundancy RSTP” in the navigation bar, then enter “Configure RSTP Parameters”.



Page information description is as shown in the following table.

Name	Description	Default
Enable RSTP	Enable or disable RSTP	enable
Bridge Priority	Set RSTP bridge priority, range from 0-61440	32768
Hello Time	Set RSTP timing time interval when sent BPDU packet, range from 1-10 seconds.	2
Max Age	Set RSTP BPDU max life time, range from 6-40 seconds	20
Forward Delay	Set RSTP spanning tree delay, range from 4-30 seconds.	15
Transmit Hold Count	Set transmit hold count per second	6

Name	Description	Default
Enable RSTP	Enable or disable RSTP	Disable
Port Priority	Set RSTP port priority, range from 0-240	128
Spanning-tree Cost	Set RSTP port route, range from 1-200000000 or auto	Auto
Edge Port	Set value of edge port, yes means force configured edge port, no means auto	No
Point-to-Point	Set connection value of point-to-point. Yes means force configured point-to-point port; no means force configured port shared link.	Auto

Attention

Hello time，the max age time, and forward delay, the three paremeters have their own value range, and they need to meet the following relationship:

2*(Hello Time + 1.0 seconds) <= Max-Age Time <= 2*(Forward-Delay – 1.0seconds)

The three parameters must meet this requirement, otherwise may lead to topology is instable.

3.4.2 G.8032v2 ERPS

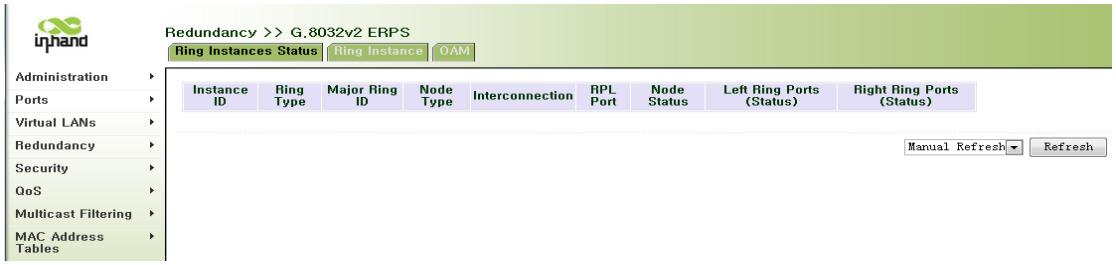
Ring protection technology is an open protocol launched by ITU which is applied in the data link layer. It can prevent broadcast storms caused by data loops. When the loop-line link or equipment failed, it can switch to a backup link, to ensure than quick business recovery. Rapid Ring Protection Protocol is the use of ring fault recovery within a dedicated control network VLAN passing ring network control message. Also, it combined with the topological characteristics of the ring itself, if malfunction

was found out, backup link will be enabled and achieve rapid recovery.

In the protection of technology, rapid spanning tree technology has been widely used. RSTP will occupy the port resources, however, the recovery time of RSTP is in the second level and cannot meet the demanding real-time in the industrial applications. More faster RSTP, ring protection protocol link malfunction recovery time can be less than 5ms.

3.4.2.1 Ring Instances Status

Click “Redundancy->G.8032v2 ERPS” in the navigation bar, then enter “Ring Instance Status” interface.



3.4.2.2 Ring Instance

Click “Redundancy->G.8032v2 ERPS” in the navigation bar, then enter “Ring Instance” interface.

“Fast Configure Normal Node”, automatic configure ring normal node

“Fast Configure Owner Node”, automatic configure ring owner node

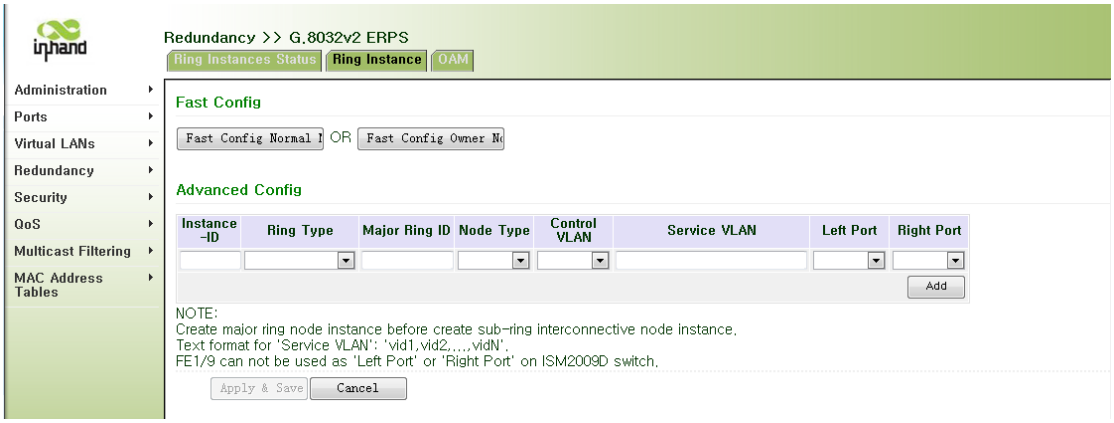
Attention

The default ring port in “Fast Configure” is based on InSwitch model。

Page information description is as shown in the following table.

Model	Left Port	Right Port
InSwitch 2008D	FE1/7	FE1/8
InSwitch 2009D	FE1/7	FE1/8
InSwitch 3010D	GX1/1	GX1/2
InSwitch 3028U	GE1/1	GE1/2

"Ring Instance" page is as shown in the following



Page information description is as shown in the following table.

Name	Description	Default
Instance ID	Set ring instance, range from 1-10	None
Ring Type	Set ring type, including major ring, sub-ring without V-chan, sub-ring with V-chan.	None
Major Ring ID	Set when choose sub-ring.	None
Node Type	Set node type, including owner node, neighbor node, normal node and interconnection node.	None
Control VLAN	Set control VLAN, range from 1-4094	None
Service VLAN	Set service VLAN, range from 1-4094	None
Left Port	Set left port	None
Right Port	Set right port	None

Attention

[1] When the node was configured major ring node, it cannot be configured subordinate major ring instance ID, value is 0.

[2] When you configure interconnection node, you need to configure ring type sub-ring

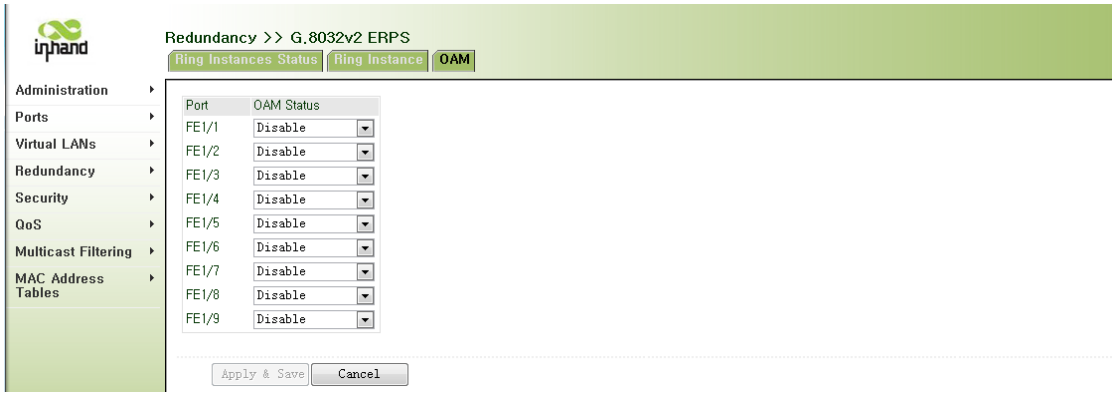
node. Major ring node cannot be configured as interconnection node.

[3] Before configuring the data VLAN of ring instance, you need to created new VLAN.

[4] You need add ring port into configured control VLAN and data VLAN

3.4.2.3 OAM

Click “Redundancy->G.8032v2 ERPS” in the navigation bar, then enter “OAM” interface.



Name	Description	Default
OAM Status	Set OAM Status.	Disable

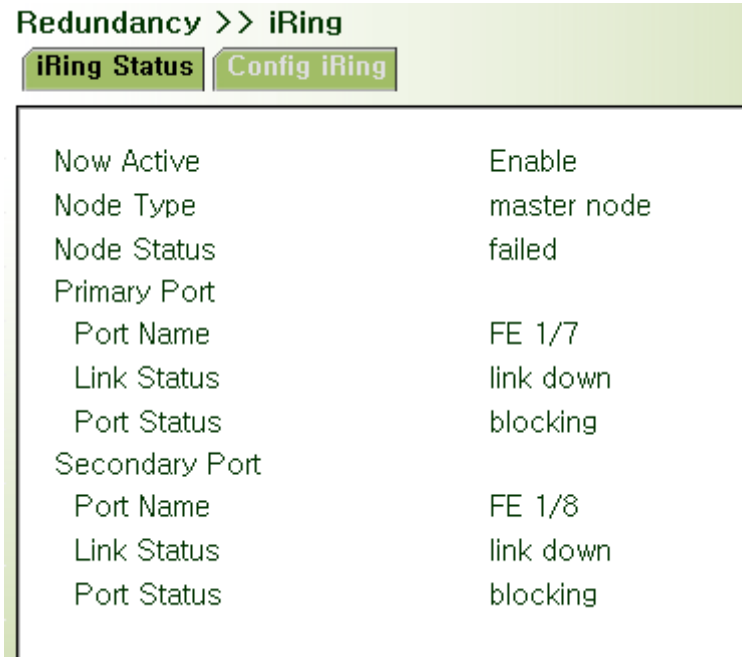
3.4.3 iRing Ethernet Ring Network Protection

iRing Ethernet ring protection protocol is private ring protocol developed by inhand. IRing Ethernet ring protection protocol define node role on the loop, and use VLAN control transmission protocol message to protect loop, make the loop quickly switch when fauls happen, switch time less than 50ms.

iRing Ethernet ring network protection system is suitable single ring topology, can effectively deal with single fault of a ring network, topology convergence rate quick, and has nothing to do with the number of nodes.

3.4.3.1 iRing Status

Click “Redundancy->iRing” in the navigation bar, then enter “iRing status” interface.



3.4.3.1 Configure iRing

Click “Redundancy->iRing” in the navigation bar, then enter “iRing configuration” interface.

Name	Description	Default
Enable iRing	whether to enable iRing protocol	
Primary Port	designate the main prot	FE1/7
Secondary Port	designate the secondary prot	FE1/8
Priority	Switch differentiate the primary or secondary port according to the	100

	priority.The port which have minimum MAC address or lowest priority will become the primary port	

Attention

The default primary and secondary port are different for different switch model.

The default primary and secondary port are shown as following table.

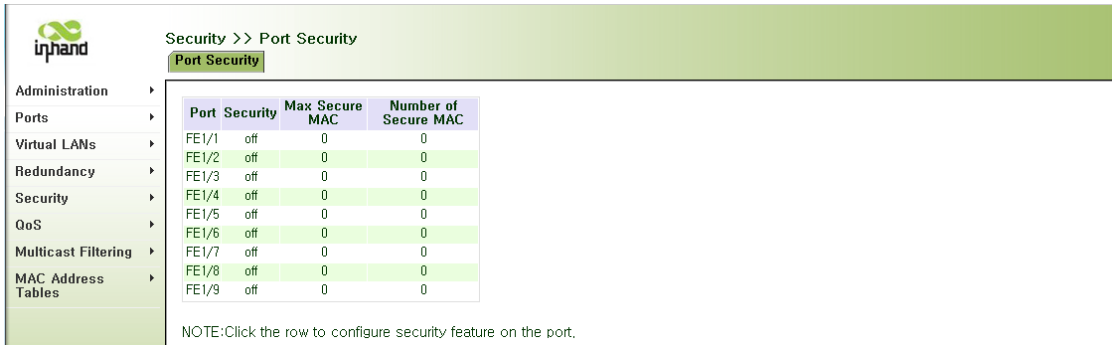
InSwitch Model	Primary Port	Secondary Port
InSwitch 2008D	FE 1/7	FE 1/8
InSwitch 2009D	FE 1/7	FE 1/8
InSwitch 3010D	GX1/1	GX1/2
InSwitch 3028U	GE1/1	GE1/2

3.5 Security

You can use port security with dynamically learned and static MAC addresses to restrict a port's ingress traffic by limiting the MAC addresses that are allowed to send traffic into the port. When you assign secure MAC addresses to a secure port, the port does not forward ingress traffic that has source addresses outside the group of defined addresses. If you limit the number of secure MAC addresses to one and assign a single secure MAC address, the device attached to that port has the full bandwidth of the port.

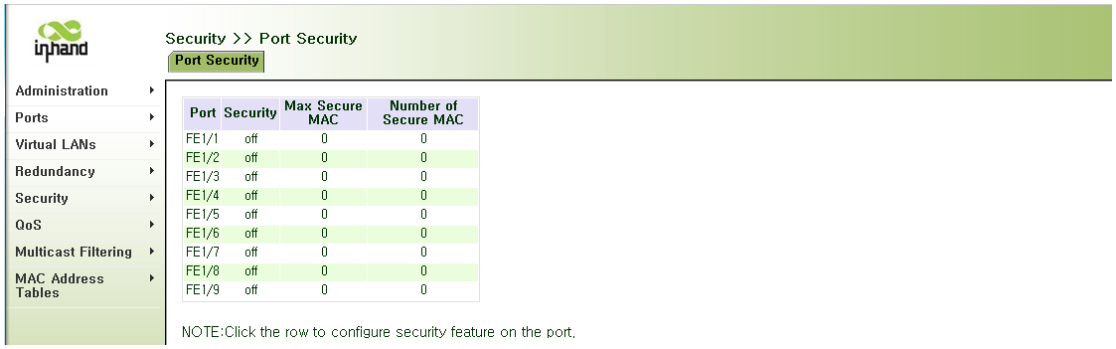
3.5.1 Display Port Security

Click “Security->Port Security” in the navigation bar, then enter “Port Security” interface.

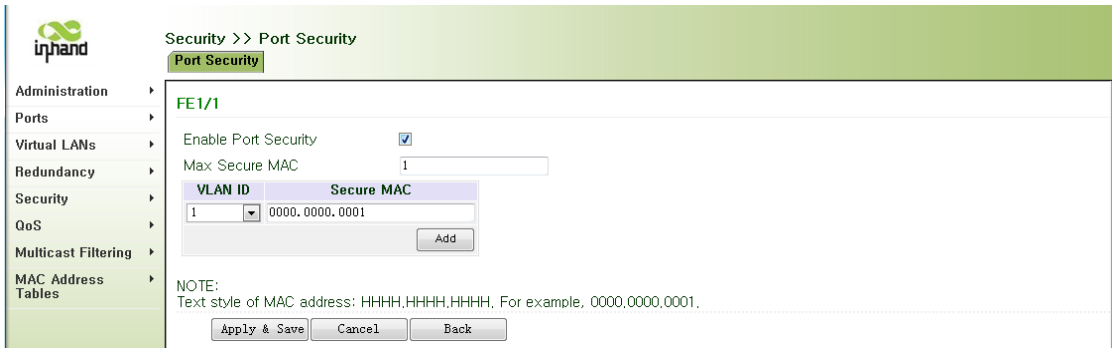


3.5.2 Port Security

Click “Security->Port Security” in the navigation bar, then enter “Port Security” interface.



You can click each port line to configure port security characteristic.



Page information description is as shown in the following table.

Name	Description	Default
Enable Port Security	Enable or disable	Disable
Max Secure MAC	Max number can be set	1
VLAN ID	VLAN ID of MAC address	1
Secure MAC	Configured secure MAC address, form should be HHHH.HHHH.HHHH	0000.0000.0001

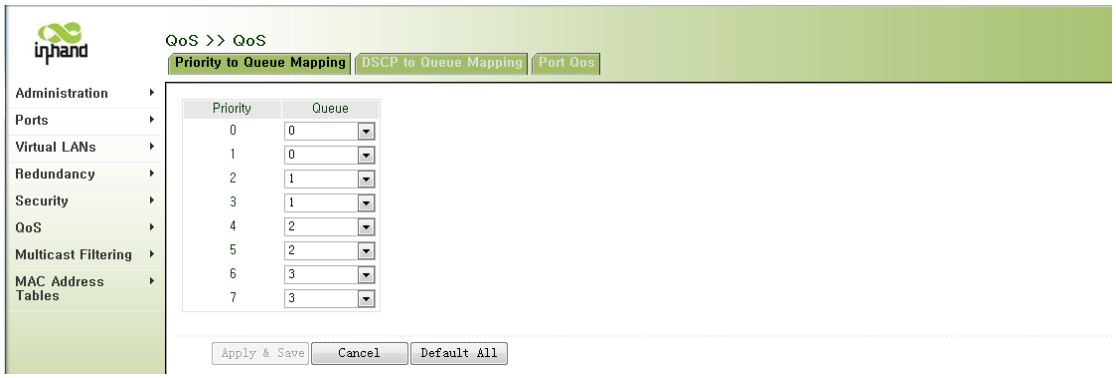
3.6 QoS

QoS (Quality of Service) that is the quality of service, can guarantee the reception of high priority data frame and accelerate high-priority data frame transmission, to ensure that critical business will not be impact by network congestion. InSwitch

support four service levels, according t data frame reception port, Tag priority and IP priority level to determine service level.

3.6.1 Priority to Queue Mapping

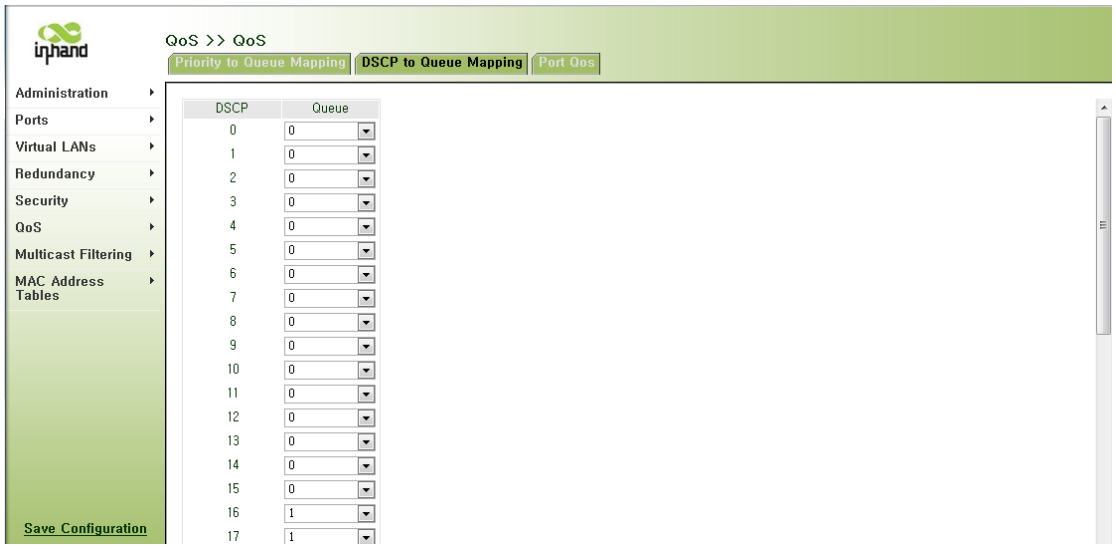
Click “QoS->QoS” in the navigation bar, then enter “Priority to Queue Mapping” interface.



Name	Description	Default
Priority	IEEE Tag Priority	None
Queue	Service level，range<0-3>，The number is more greater, the sevice level is more higher **Note：The range of rack switch<0-7>**	Default Mapping： Priority Level 0-1 --->Queue0 Priority Level 2-3 --->Queue1 Priority Level 4-5 --->Queue2 Priority Level 6-7 --->Queue3 **Note：The default map of rack switch：** Priority Level 0 --->Queue 0 Priority Level 1 --->Queue 1 Priority Level 2 --->Queue 2 Priority Level 3 --->Queue 3 Priority Level 4 --->Queue 4 Priority Level 5 --->Queue 5 Priority Level 6 --->Queue 6 Priority Level 7 --->Queue 7

3.6.2 DSCP to Queue Mapping

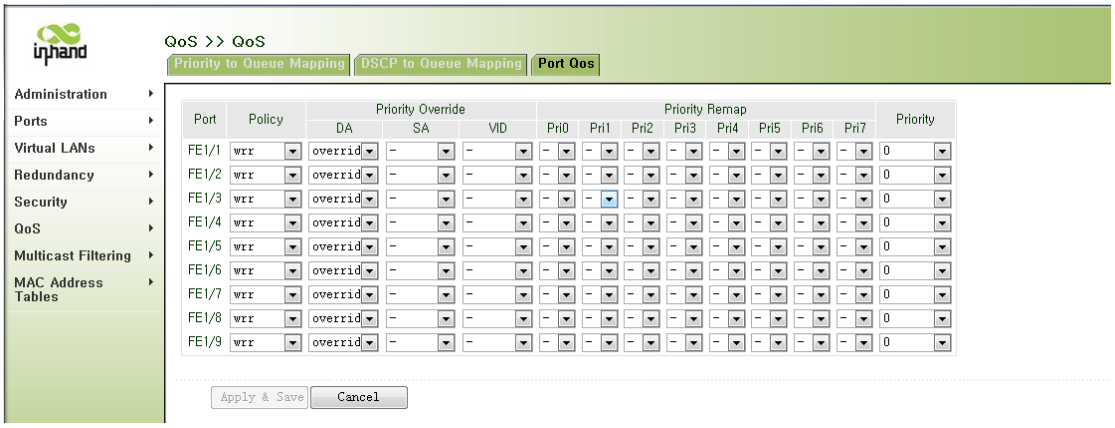
Click “QoS->QoS” in the navigation bar, then enter “DSCP to Queue Mapping” interface.



Name	Description	Default
DSCP	IP priority, range from<0-63>	None
Queue	Service level, range from<0-3>.	Default mapping: Priority 0-15→ Queue 0 Priority 16-31 → Queue 1 Priority 32-47 → Queue 2 Priority 48-63 → Queue 3

3.6.3 Port QoS

Click “QoS->QoS” in the navigation bar, then enter “Port QoS” interface.



Name	Description	Default
Policy	Port sending queue policy, you could	Wrr

	choose: Wrr(Weighted rotation strategy) Sp(Strict priority policy)	Queue 3:2:1:0 should match weight 8:4:2:1
Priority Override	Change data frame tag priority according to information below: Destination MAC, source MAC, VLAN ID	Disable
Priority Remap	Data frame original tag priority was mapped new tag priority.	No change
Priority	Port default priority, range from 0-7	0

3.7 Multicast Filtering

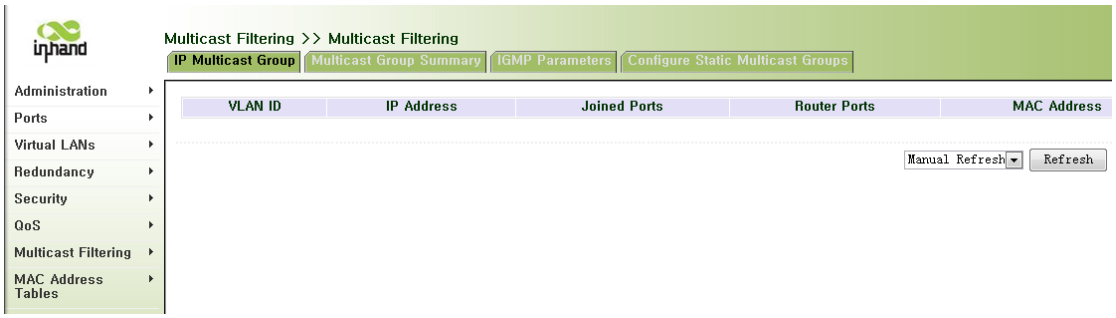
InSwitch multicast filtering features:

- IGMP Snooping support industrial standard IGMP v1,v2,v3 (RFC 1112, RFC 2236, RFC 3376), has active and passive mode.
- Support enabling or disabling IGMP Snooping base on VLAN,up to 16 VLAN can enable IGMP Snooping.
- Support multi-router port's static configuration and IGMP Snooping dynamic identification.
- Support IGMP Snooping operation in "no-router" surrounding
- Support IGMP multicast group member port's static configuration
- Support static multicast group configuration
- Support 256 multicast group

3.7.1 IP Multicast Group

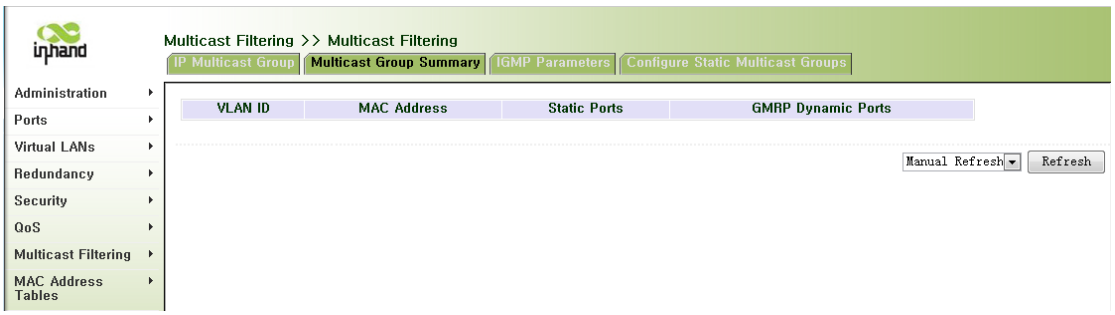
Click "Multicast Filtering-> Multicast Filtering" in the navigation bar, then enter "IP Multicast Group" interface.

In the table, you will see IP multicast group information, including VLAN ID, IP address, Joined ports, Router ports, MAC address.



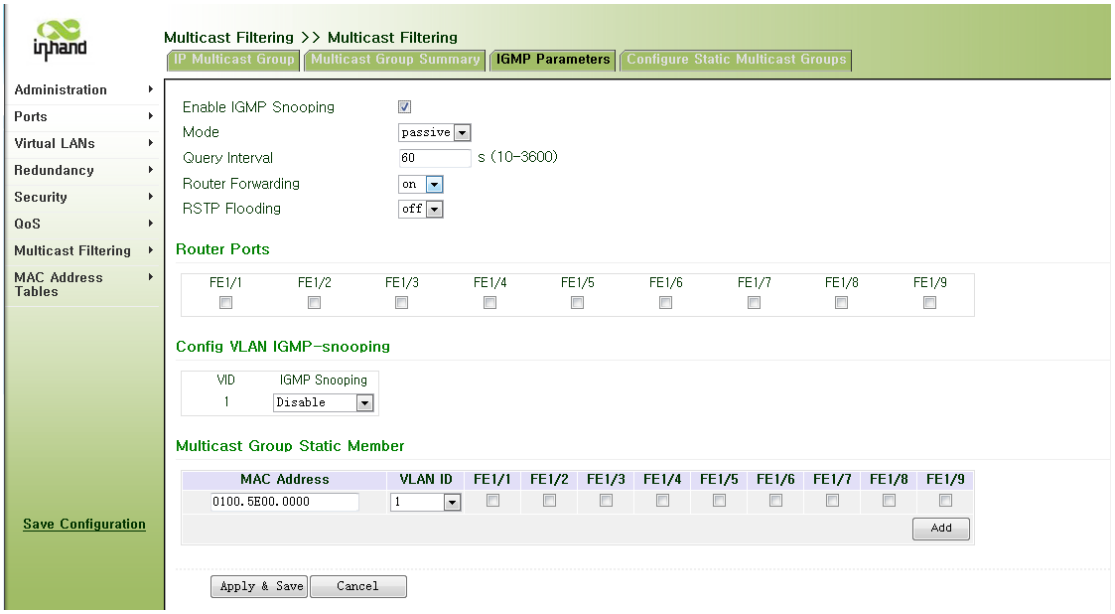
3.7.2 Multicast Group Summary

Click “Multicast Filtering-> Multicast Filtering” in the navigation bar, then enter “IP Multicast Group” interface.
In the table, you will see multicast group summary of dynamic configuration, including VLAN ID, MAC address, static port.



3.7.3 IGMP Parameters

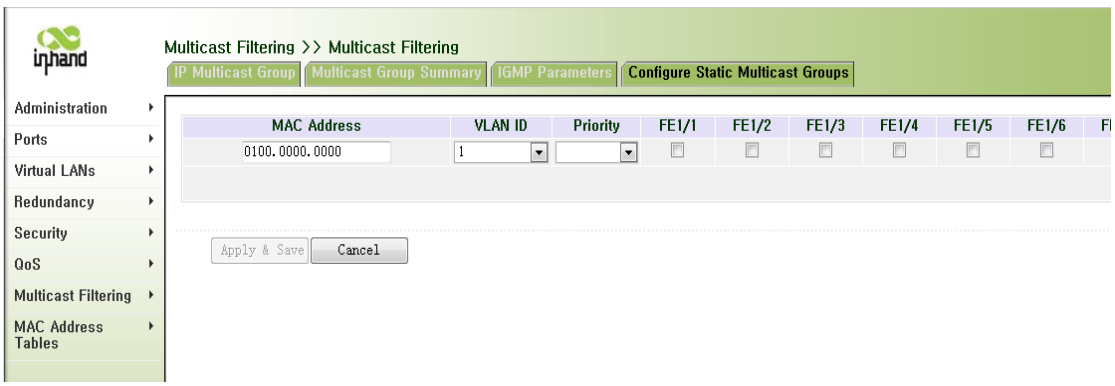
Click “Multicast Filtering-> Multicast Filtering” in the navigation bar, then enter “IP Multicast Group” interface.



Name	Description	Default
MAC address	Input MAC address that match with IGMP multicast group	None
VLAN ID	Choose multicast group VLAN	None
Port	Choose IGMP multicast group's static member port	None

3.7.4 Configure Static Multicast Groups

Click "Multicast Filtering-> Multicast Filtering" in the navigation bar, then enter "IP Multicast Group" interface.



Name	Description	Default
MAC address	Input MAC address that match with IGMP multicast group	None
VLAN ID	Choose multicast group VLAN	None
Priority	Choose priority of static multicast group address lis	7
Port	Choose IGMP multicast group's static member port	None

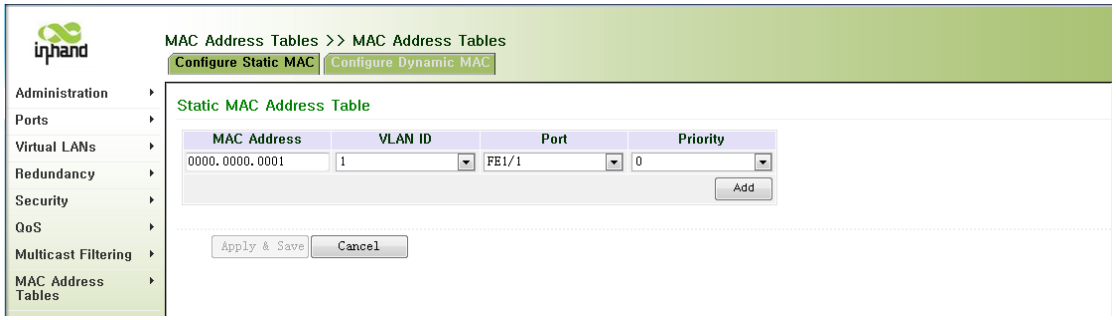
3.8 MAC Address Tables

MAC Address list features:

- Check the learning MAC address
- Delete unicast MAC table items
- Configure switch MAC address aged time
- Configure static unicast MAC address

3.8.1 Configure Static MAC

Click "MAC Address Tables-> MAC Address Tables " in the navigation bar, then enter "Configure Static MAC" interface.

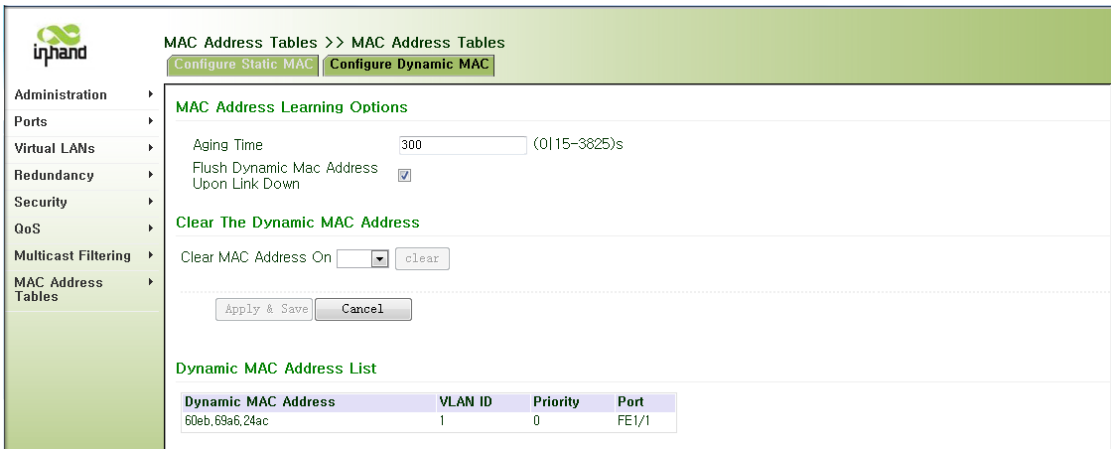


Name	Description	Default
MAC address	Input unicast MAC address	None
VLAN	Input host belonged VLAN	1
Port	Input port matched with MAC	None

	address	
Priority	Input priority matched with MAC address	0

3.8.2 Configure Dynamic MAC

Click “MAC Address Tables-> MAC Address Tables ” in the navigation bar, then enter “Configure Dynamic MAC” interface.



Name	Description	Default
Remove dynamic MAC address	Choose removed dynamic MAC address	None
Aged time	Input MAC address aged time	300

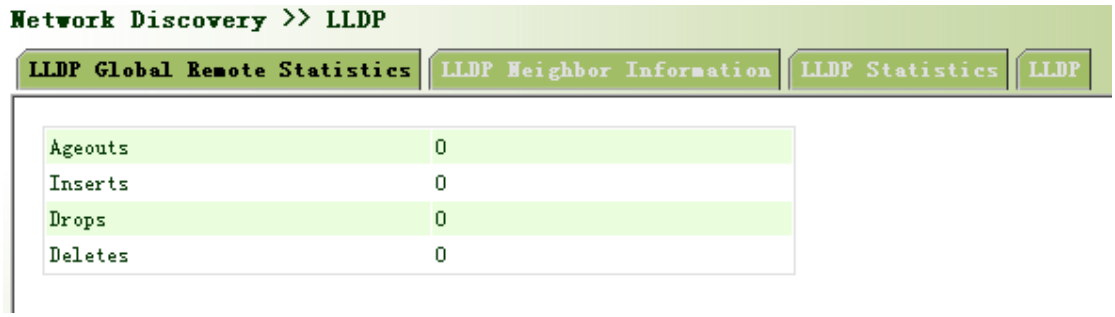
3.9 Network Discovery

Link Layer Discovery Protocol running on the data link layer. Through the LLDP, one device can obtain some information of other devices which connected with (such as the host name), even they are running different protocols on the network layer.

3.9.1 LLDP Global Remote Statistics

Click “Network Discovery-> LLDP” in the navigation bar, then enter “LLDP

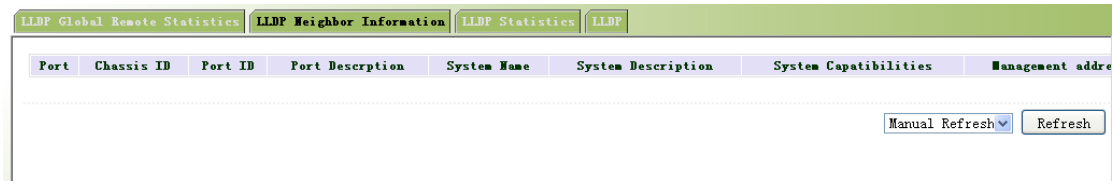
Global Remote Statistics" interface.



This page displays the LLDP global remote statistics network discovery, including overtime frame, insert frame, discard frame,and delete frames.

3.9.2 LLDP Neighbor Information

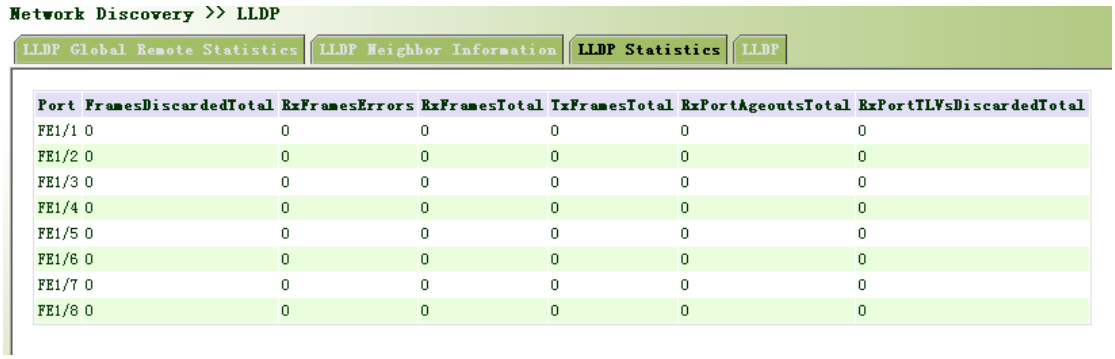
Click "Network Discovery-> LLDP" in the navigation bar, then enter "LLDP Neighbor Information" interface.



This page displays the network discovery LLDP neighbor information, including port, classis ID, port ID, port description, system name, system description, type of equipment, management address.

3.9.3 LLDP Statistics

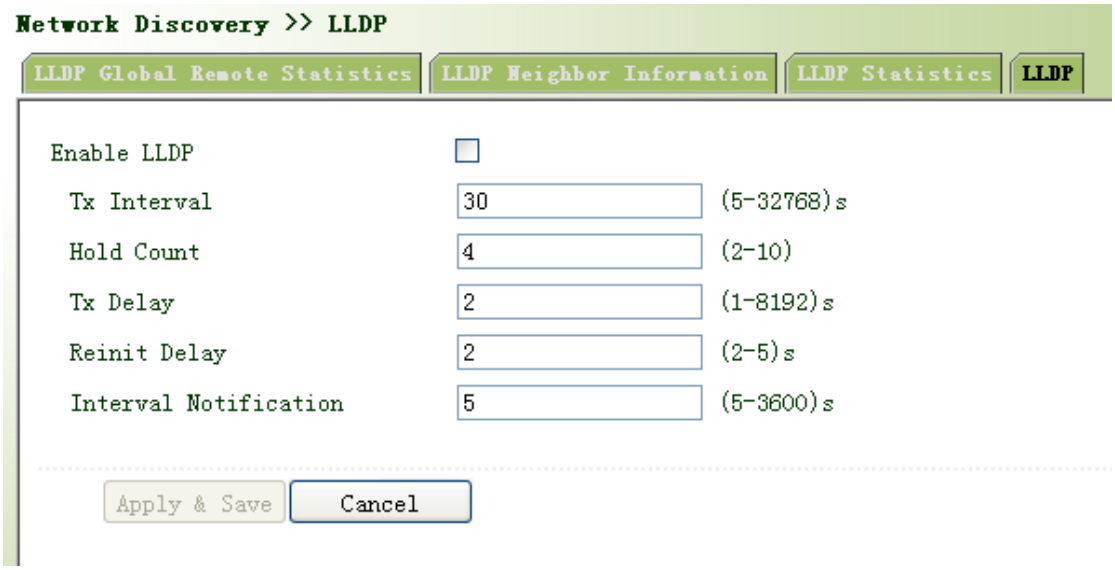
Click "Network Discovery-> LLDP" in the navigation bar, then enter "LLDP Statistics" interface

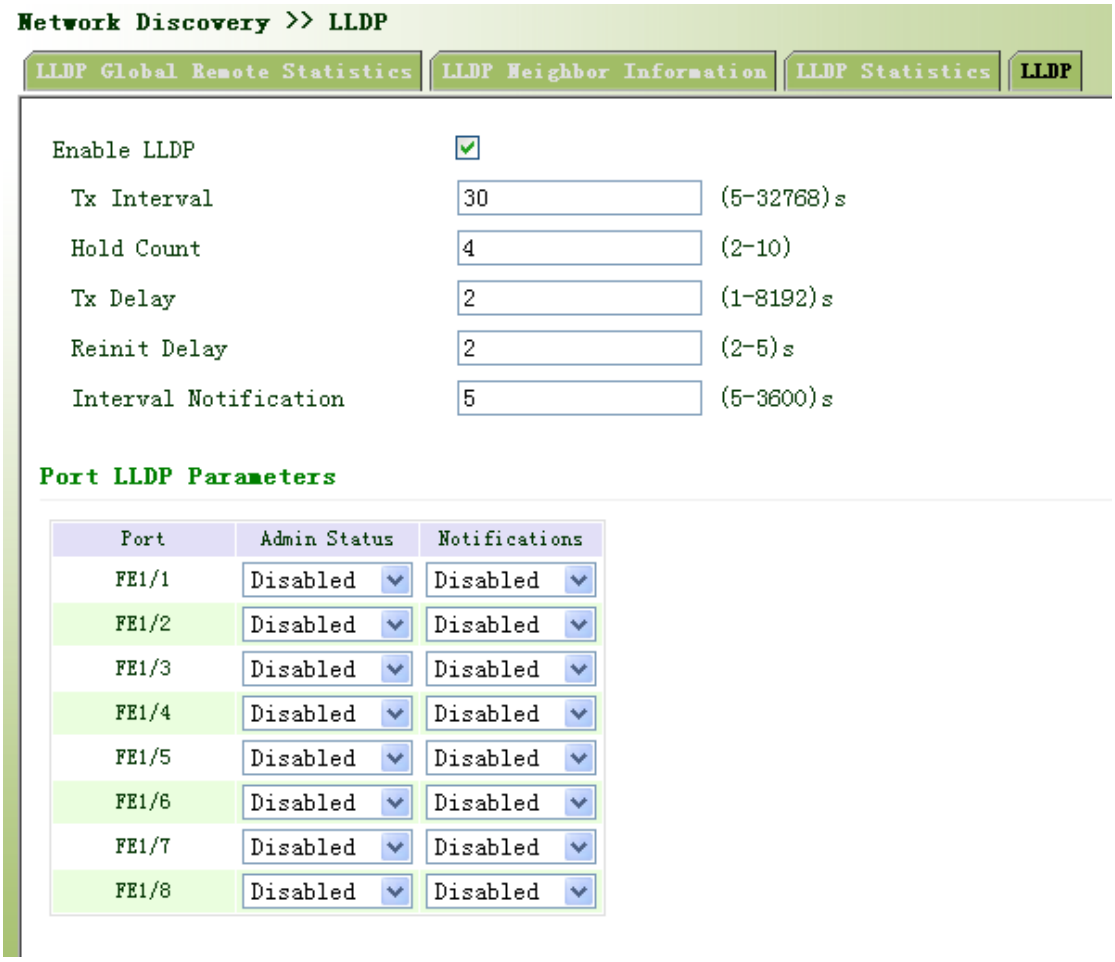

Network Discovery >> LLDP
LLDP Global Remote Statistics
LLDP Neighbor Information
LLDP Statistics
LLDP
Port FramesDiscardedTotal RxFramesErrors RxFramesTotal TxFramesTotal RxPortAgeoutsTotal RxPortTLVsDiscardedTotal
FE1/1 0 0 0 0 0 0
FE1/2 0 0 0 0 0 0
FE1/3 0 0 0 0 0 0
FE1/4 0 0 0 0 0 0
FE1/5 0 0 0 0 0 0
FE1/6 0 0 0 0 0 0
FE1/7 0 0 0 0 0 0
FE1/8 0 0 0 0 0 0

This page displays the LLDP statistical, including the various ports of the discarded frames, receive error frame, received frame, send frame, frame, receive timeout receive frame and receive TLV frame discard

3.9.4 LLDP

Click “Network Discovery-> LLDP” in the navigation bar, then enter “LLDP ” interface.





3.10 DHCP Batch Configuration

Automatically batch configuring switches via DHCP and TFTP can save time and lower labor cost, making management and maintenance much easier. It also avoids manual configuration errors caused by improper operation, avoid repetitive work and ensure configuration consistency.

DHCP refers to an IP address range controlled by server. It assigns IP address and Subnet Mask once the clients log on.

TFTP is a simple file transfer protocol used to transfer files between remote server and local host. TFTP protocol is based on UDP protocol. TFTP transfer request is initiated by the client, when the TFTP client needs to download files from the server, the client sends a request packet to the TFTP server, and receives data from the server and sends acknowledgment.

3.10.1 DHCP Batch Configuration Preparation

1) Enable TFTP Server. Prepare switch configuration files and save effective configuration files under TFTP directory.
2) Enable DHCP Server. Configure DHCP parameters related to TFTP Server, sharing the IP address of TFTP Server where configuration files are saved and the name of configuration files (.cnf); DHCP Server assigns IP address，network mask，default gateway to switches.

3.10.2 Parameters Configuration

Click “Administration> Networks” in the navigation bar, then enter “Networks” page. Click “DHCP Client” and “Enable Config via DHCP Server” as shown below, then click “Apply&Save” to save configuration; swithes will automatically acquire configuration files and upload to the system.

Instruction

- When DHCP client have been enabled, if you also enable “Enable Config via DHCP Server”, the DHCP client will reboot.
- When DHCP client haven’t been enabled, if you enable “Enable Config via DHCP Server”, DHCP client will be enabled automatically.
- After acquiring configuration files and uploading to switch, the switch will automatically reboot. After reboot, “Enable Config via DHCP Server” function will be disabled by default. When the function is enabled but the configuration is not acquired, if switch reboots(user reboot or caused by other reasons) the “Enable Config via DHCP Server” function is enabled by default.
- After the configuration is acquired, switch’s IP address, subnet mask, default gateway and DNS are still from DHCP Server, not from configuration files.
- Normally, it takes 40 seconds from enabling to configuration acquired(exclude switch reboot time).

On switch WEB page, the description in the brackets following “Enable DHCP Configuration” shows the satus of configuration:

1) “Config is already acquired": Configuration has been successfully acquired from server. This case includes: (1) Acquiring configuration function is now “Enabled” and configuration acquired; (2) the function is now “Disabled”, but the configuration is acquired after last time’s “On”.
2) “Config is not acquired yet”: Acquiring configuration function has been enabled, but configuration is not acquired yet.
3) “Not enabled”: Acquiring configuration function is not enabled.

Attention

- Before acquiring configuration successfully, if this function or DHCP function is disabled, the status will be switched to “Not enabled”.
- After obtaining IP address and configuration file via DHCP, the IP related configuration parameters will be saved to configuration file, that means the switch’s static IP address is the IP address assigned by DHCP. So it’s necessary to modify the IP address pool of DHCP server after finish the deployment, in case to assign a same IP address to other device.

3.11 USB Configuration auto- Backup and Restore by USB Disc

When the switch needs to be replaced due to failure, you can back up the configuration file from the faulty switch with a USB disk. USB disk can be used to backup and automatically synchronize the configuration file of the switch.

When the system of the switch detects a USB disc inserted, if there is no configuration files inside in the USB disc, the current configuration file will be downloaded into the USB disk. Thereafter, when the configuration changes, the system will automatically synchronize the changes to the USB disc to keep the configuration file in the USB disk is always the latest.

Highly suggest that each switch equipped with a USB disc, this can keep the real-time synchronizationWhen the equipment needs to be replaced due to failure, simply insert the USB disc form the faulty switch into the replaced switch, then reboot this switch by power on. In this process, when the configuration files in the USB disk detected by the replaced switch, the switch will automatically download this configuration file form the USB disc and restore, complete seamlessly replacement.

Appendix 1 Introduction to CLI Command

1 Help

After entering CLI, input “help”, you can know more about help information user guide.

****

11:06:35 InSwitch > help

Input interrogation mark “?”, you can check help information at any point of command. If it does not match successfully, then the help list is empty. You must back to input content until system shows valid option after input “?”.

System provides two kind of help style:

1. When you have prepared command parameter, please using entire help. For example, “show ?”

Entire help will describe every potential parameter.

2. When you input a short parameter and want to get matching parameter list, please using part help. For example, “show pr?”.

11:06:35 InSwitch>

****

2 User Mode

Login CLI means login user mode. Input “?”, it will show executable command.

****

11:08:44 InSwitch>

command	Description
Enable	Switch to privileged mode
Exit	Quit view/control
Help	Get help command
Hostname	Set hostname
Language	Set operation language
Ping	Ping detection
Show	Show running status
Telnet	Telnet login
traceroute	Router detection

11:08:44 InSwitch>

****

3 Privileged Mode

With user mode, input “enable ”, you will enter privileged mode, input “?”, it will show the executable command.

****

11:20:07 InSwitch>enable
Please input password:
11:20:09 InSwitch#

Executable command:

command	Description
Configure	Enter configure mode
Copy	Copy files
Default	Recover appointed parameter as default
Disable	Quit privileged mode
Erase	Clear files
Exit	Quit view/control
Help	Get help command
Hostname	Set hostname
Language	Set operation language
No	Cancel setting of appointed parameter
Password	Set password
Ping	Ping detection
reboot	Reboot system
Show	Show running status
Telnet	Telnet login
traceroute	Route detection
Username	Set username and password

11:20:10 InSwitch#

****

4 Configure Mode

With privileged mode, input “configure terminal”, enter configure mode, then input “?”, it will show executable command.

****

11:21:10 InSwitch# configure terminal

11:21:11 InSwitch config#

command	Description
Alarm	Set warn
Clear	Clear information or configuration
Clock	Set system time
Copy	Copy files
Crypto	Set SSH parameter
Default	Recover appointed parameter as default
Disable	Quit privileged mode
Email	Set email parameter
Erase	Clear files
Exit	Quit view/control
G8032	G8032 ring network protected protocol
gmrp	GMRP configuration
help	Get help command
Hostname	Set hostname
Iec61850	IEC 61850
interface	Enter port mode
ip	Overall IP configuration
language	Set operation language
lacp	LACP setting
lldp	LLDP protocol
log	Remote log server
mac	MAC address setting

monitor	Port moniter
no	Cancel setting of appointed parameter
password	Set password
ping	Ping detection
port-channel	TRUNK setting
qos	QoS
reboot	Reboot system
rmon	Remote moniter
relay	Set relay parameter
show	Show running status
snmp-server	Modify SNMP parameter
sntp-client	Set network time server
spanning-tree	Spanning-tree protocol
telnet	telnet login
traceroute	Route detection
temperature	Set temperature for warning limitation
username	Set username and password
vlan	VLAN setting

11:21:14 InSwitch config#

****

5 Port mode

With privileged mode, input “interface fastehernet 1/1”, enter fastethernet 1/1 port mode, then input “?”, it will show executable command.

****

11:23:02 InSwitch config# interface fastethernet 1/1

11:23:02 InSwitch-FE-1/1#

11:23:46 InSwitch-FE-1/1#

Port configuration command:

command	Description
block	Block flow of port

cfm	Link connection detect
channel-group	Ethernet connection pond setting
default	Recover appointed parameter as default
description	Add interface description
discard	Import frame discard
duplex	Setting duplex-mode
exit	Quit view/control
Flow-control	Flow control
help	Get help command
lacp	LACP port configuration
learn	MAC address learning
lldp	Setting LLDP
no	Cancel setting of appointed parameter
Port-security	Port security
protected	Set port protection
qos	QoS
rate-limit	Limit rate
rmon	Remote moniter
show	Show running status
shutdown	Port off
spanning-tree	Spanning-tree protocol
speed	Set port rate
storm-control	Control storm
vlan-tunnel	VLAN transparent transmission

11:23:47 InSwitch-FE-1/1#

****

6 VLAN Mode

With privileged mode, input “VLAN 100”, enter VLAN mode, then input “?”, it will show executable command.

****

11:25:05 InSwitch config# vlan 100
11:25:06 InSwitch-vlan-100#

VLAN configuration command:

command	Description
default	Recover appointed parameter as default
exit	Quit view/control
help	Get help command
Iec61850	IEC 61850
member	Setting VLAN member
name	Add VLAN name
no	Cancel setting appointed parameter
priority	Setting VLAN priority
show	Show running status

11:26:59 InSwitch-vlan-100#
****

7 Ring Instance Configuration Mode

With privileged mode, input “g8032 10”, enter ring instance configuration mode, then input “?”, it will show executable command.

****
11:28:56 InSwitch config#
11:29:05 InSwitch config# g8032 10
G8032 Instance id is 10, is ok
11:29:05 InSwitch-InRing-10#

Get help command

You can input “?” to get help anytime during inputting command

command	Description
control-vlan	Set ring network control vlan
default	Recover appointed parameter as default
enable	G8032 instance
exit	Quit view/control
help	Get help command
no	Cancel setting appointed parameter

node-type	Set node type
port	Set ring network port
ring-type	Set ring type
show	Show running status
service-vlan	Set ring netword data vlan

11:29:07 InSwitch-InRing-10#

****

Attention:

After one ring instance worked, the instance is running, it cannot enter configuration mode.

Appendix 2 Ring Network Configuration Example

First, there are two data path in the ring network, including the data path of transmitted ring control message and data path of transmitted business data. As a result, before configuring ring, you need to establish data path, that is configured VLAN. Then, there are three different roles of nodes in the ring, respectively owner node, neighbor nodes and normal nodes.

- Owner node: when the ring network link failure, open backup link in time and notify the other nodes; after a link back to normal in the ring network, please block backup link.
- Neighbor node: when the ring network link failure, open backup link in time; after the ring network link recovery, waiting for a confirmation sent by owner node that link is normal, then block backup link.
- Normal node: when the ring network link failure, notify other nodes.

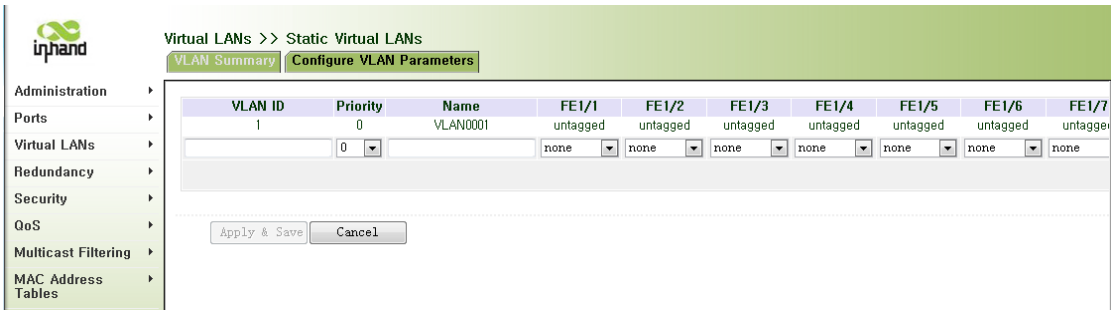
In the ring network, you must configure an owner node, however, neighbor node configuration is not required. Finally, after the end of each node configured, pay attention that the left port is backup link port as default for owner node and neighbor node, so you need to ring the two ports connected to the left.

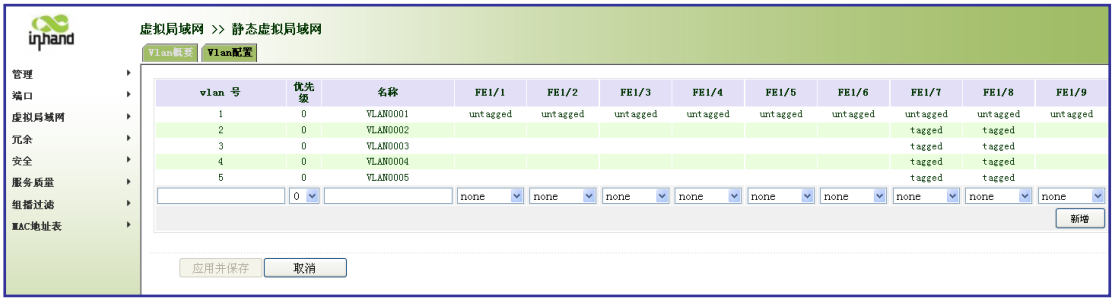
Take 4 ISM2009D industrial Ethernet switch as example. The configuration step as below:

Step 1: Configure Data Path

Click “Virtual LANs□ Static Virtual LAN ” in the navigation bar, then enter “VLAN configure” interface.

In each switch, add tagged port FE1/7 and FE1/8 into VLAN 2,3,4,5, then click apply.

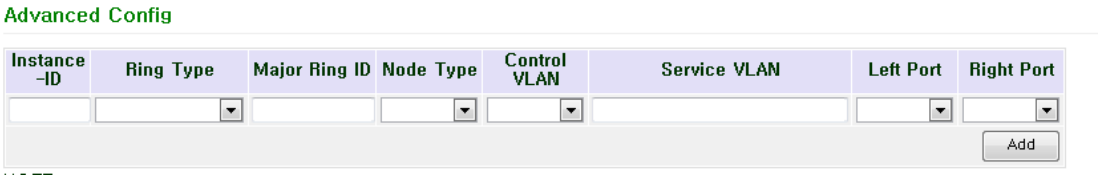




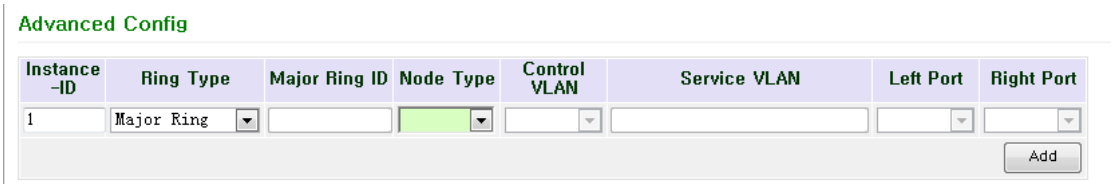
Step 2: Configure Ring instance

The 4 industrial Ethernet switch should be configured as node's role. You need configure one switch with owner node, one switch with neighbor node and two switches with normal node. Take owner node as example, other nodes' configuration are same like owner node.

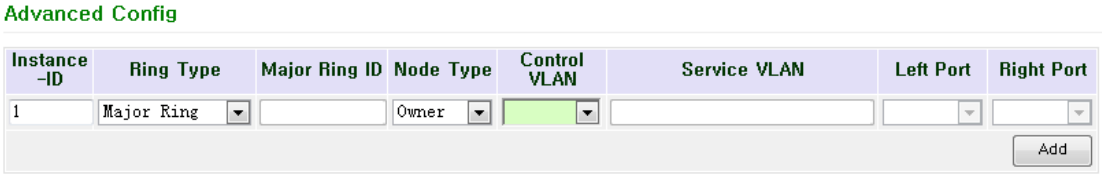
1. Set instance ID, range from 1 to 10. Set 1 as instance ID here.



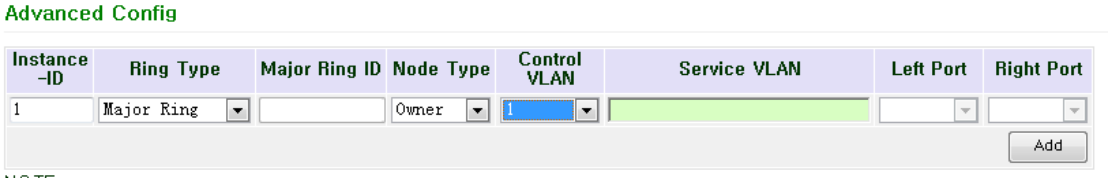
2. Choose ring type as major ring.



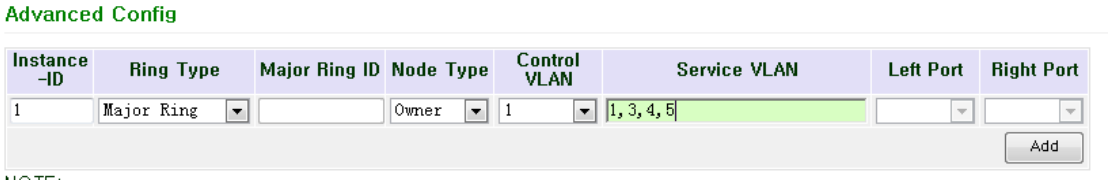
3. Choose node type as major ring.



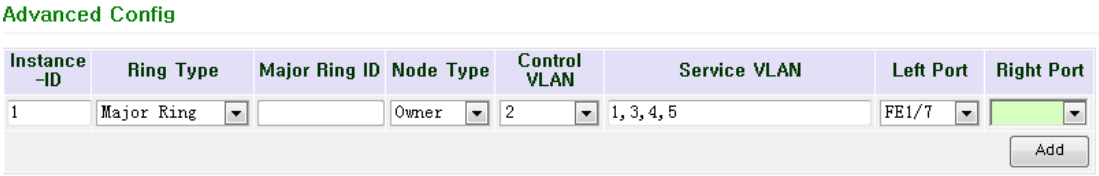
4. Choose control VLAN, set 2 as control VLAN here



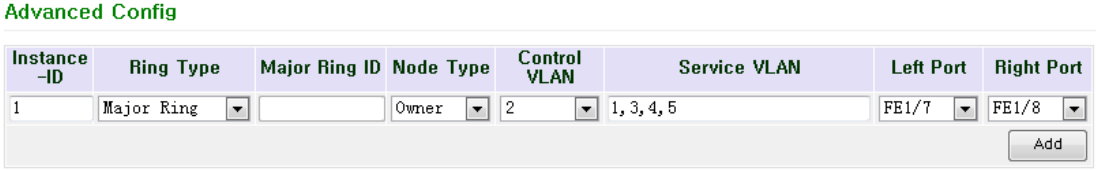
5. Configure data VLAN, input VLAN that configured in step 1. Set data VLAN 1, 3, 4, 5, the number was separated by comma.



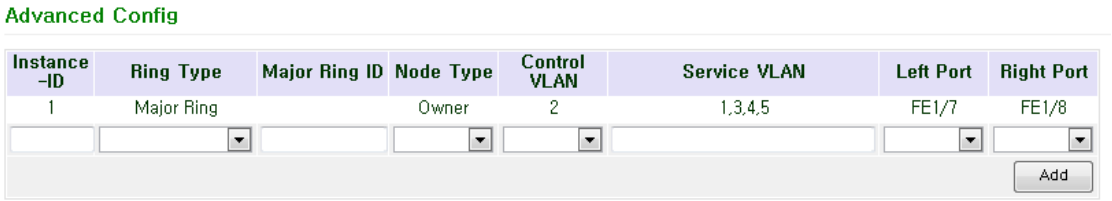
6. Configure left port. Choose one trillion optical port FE1/7 as left port.



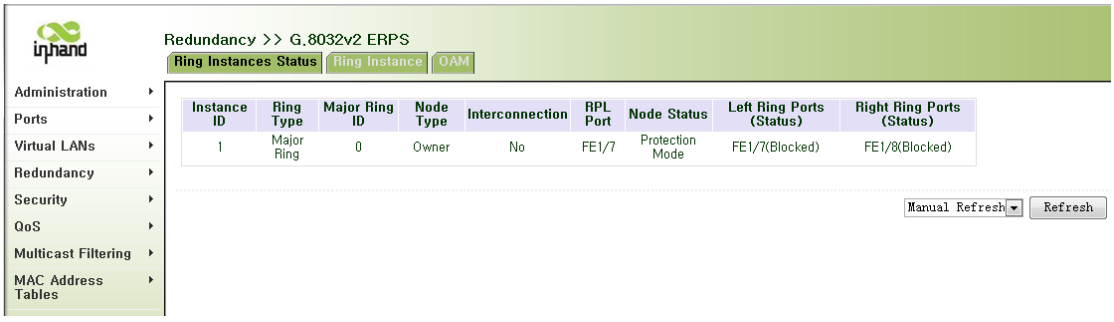
7. Configure right port. Choose one trillion optical port FE1/8 as right port.



8. Click “add”, then click “apply and save”, configure owner node successfully.



9. After configuration was finished, click “Ring Instance Status” to see ring network status.



Step 3: Connect Ring Network

After 4 industrial Ethernet switch have been configured, connect them to a ring. First, connect left port of owner node with left port of neighbor node. Secondly, make the other switches connect to a ring. The other link have no ring port limitation.

Appendix 3 Troubleshooting

FAQ	Methods
Power indicator doesn't light	(1) Please check the power line if connected correctly. (2) Please check the power line plug is plugged in tight, no loose
Port indicator doesn't light	(1) Please check if the cable and switch port connect tightly, there are no loose (2) Two cables are respectively inserted into the two port of the switch, if the two indicators that two Ethernet prots corresponding to light, that means cable is normal; otherwise the cable may be a problem, please replace the cables and try again
Can't access to switch by WEB	(1) Using the ping command to check network ● Ping 127.0.0.1 to check the TCP/IP if is installed ● Ping the defautlt IP address of switch, to check if the PC can communicate with switch. (2) Ensure the PC's IP is in a same network segment with switch (3) check the Web browser is set up a proxy server or dial-up connection, if any, please cancel

Appendix 4 Glossary

Abbreviations	Full Name	Meaning
100Base-TX	100Base-TX	100Mbit/s baseband Ethernet standard, using the type 5 twisted pair to connect, can provide the maximumtransmission rate of 100Mbit/s
10Base-T	10Base-T	100Mbit/s baseband Ethernet standard, using the type 3/4/5 twisted pair to connect, can provide the maximumtransmission rate of 10Mbit/s
Ping	Packet Internet Grope	The Ping command is a diagnostic tool used to test the machineand other computers on the network can communicate. The Ping command message to the specified computer, if the computerreceives a message will return a response message
QoS	Quality of Service	Quality of service (Quality of Service) is used as a technique to solve the network delay and congestion. When the network overload or congestion, QoS can ensure the important traffic without delay or discarded, while ensuring the efficient operation of network.
RJ-45	RJ-45	For standard plug connected with Ethernet switches, hubs, routers and other equipment. Straight cable and a crossover cable typically use this joint
SNMP	Simple Network Management Protocol	SNMP is the communication rules between the NMS and agent in the network, it defines a series of messages, and grammar, is used to realize the access and management of NMS to agent
Telnet	Telnet	A method used to access remote host's interactive program based on characters. Telnet Allows users to remotely log on and manage device

WAN	Wide Area Network	Wide area network (Wide Area Network) is a data communication network covering the geographic range is relatively wide, such as the Internet
LAN	Local Area Network	LAN (Local Area Network) generally refers to the internal network, such as the family network, small and medium-sized enterprise internal network etc.

Support

In case you have problems with the installation and use, please address them to us by e-mail:

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